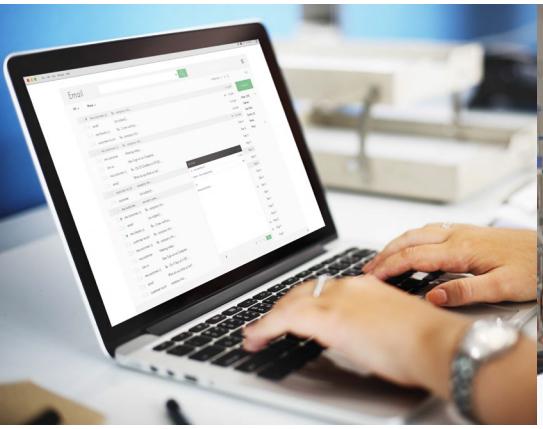
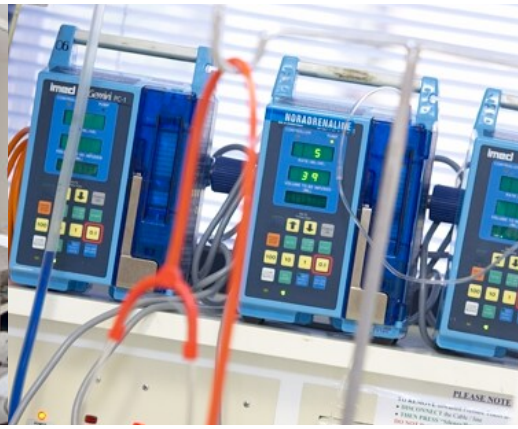
ANZICS





Australian and New Zealand Intensive Care Society

Centre for Outcome and Resource Evaluation

Intensive Care Resources and Activity Report 2017/18

Australia and New Zealand Intensive Care Resources & Activity Report 2017/18

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Executive Summary: Critical Care Resources & Activity

The 2017/18 CCR survey was completed by 170 Intensive Care Units (ICUs) in Australia and New Zealand. The report includes all contributing ICUs and high dependency units (HDU) managed by the intensive care team. This represents 78% of the 217 open ICUs, 82% of public ICUs and 71% of private ICUs. Bed analysis includes data from all Australian and New Zealand ICUs, whilst activity data only includes ICUs that contributed to the survey. Reported changes over 2 or 5 years are based on consistently contributing ICUs.

Changes in Critical Care Resources & Activity

- 0.9% growth in available beds
- 1% increase in admissions
- 2.6% decrease in patient days
- Of the 170 ICUs, 25 expect to increase available beds in 2018
- Staffing kept pace with activity changes.

Admissions & Patient Days

- 214,760 admissions were reported from 200 ICUs
- 527,253 patient days were reported from 156 ICUs with a 11.5% decrease in private ICUs, compared to a 1% decrease in public ICUs
- Metropolitan ICUs had a 0.3% increase in patient days, whilst private, tertiary and rural ICUs had a decrease of 11.5%, 1.4% and 0.3% respectively.

Availability of ICU Beds

2,482 available beds (n=207) and 2,985 physical beds (n=209) across contributing ICUs, with a 0.9% increase in available beds (n=204) and 1.8% increase in physical beds (n=206).

New Beds to be Built or Opened in 2019 FY

- 25 ICUs reported planning to build new physical beds, an expected net gain of 118 physical beds.
- 25 ICUs plan to open new available beds, a net gain of 117 available beds.
- Of the 117 available beds expected to open, 63 beds will open in tertiary ICUs.

Regional Change in Available Beds

Regions with an increase in available beds:

- NSW 9 beds (1%)
- SA 1 bed (0.6%)
- VIC 10 beds (2.2%)
- WA 8 beds (4.8%)
- NZ 1 bed (0.4%)

QLD had a decrease of 7 beds (1.7%)

ACT, NT and TAS had no change in available beds.

Ventilation

In 2017/18, the proportion of ventilated patients was 35.4%, down from 36.0% in 2017. The proportion of patients receiving invasive ventilation continues to decline.

Health Service Changes

New Hospital ICU/HDU/PICUs Opened

- Calvary Bruce Private HDU (ACT, Private)
- John Hunter Children's Hospital PICU (NSW, Tertiary)
- Monash Children's Hospital PICU (VIC, Tertiary)
- Perth Children's Hospital PICU (WA, Tertiary)
- St John of God Berwick ICU (VIC, Private)
- Sunshine Coast University Hospital PICU (QLD, Tertiary)
- The Bays Hospital ICU (VIC, Private).

Hospital ICU/HDU/PICUs Closed

- Geelong Private Hospital ICU (VIC, Private)
- Repatriation General Hospital Adelaide ICU (SA, Metropolitan)
- Princess Margaret Hospital for Children PICU (WA, Tertiary) – transitioned to Perth Children's Hospital PICU.

Executive Summary: Critical Care Resources & Activity

Workforce

Senior Medical Workforce

152 ICUs (89%) reported Senior Medical Officer (SMO) data for 2017/18 with a total of 783.1 full time equivalent (FTE).

- 120 ICUs (81.1%) reported intensivists work between 4-7 consecutive days (range 1-8)
- 119 ICUs (70%) reported having practicing female intensivists (n=257) with a total of 160.1 FTE (20.4%)
- 3.1% increase in SMO FTE (n=129)
- 2.7% increase in SMO FTE in public ICUs (n=99)
- 5.8% increase in SMO FTE in private ICUs (n=30).

The SMO Established FTE per 1000 patient days has remained consistent at 1.5 FTE, with admission numbers increasing by 1.0% despite the reported 2.6% decrease in patient days for 2017/18.

Nursing Workforce

164 ICUs reported permanent registered nurse (RN) data for 2017/18 with a total 98226.1 FTE.

- 3.3% increase in permanent RN FTE (n=143)
- 3.5% increase in public ICUs (n=108)
- 1.8% increase in private ICUs (n=35).

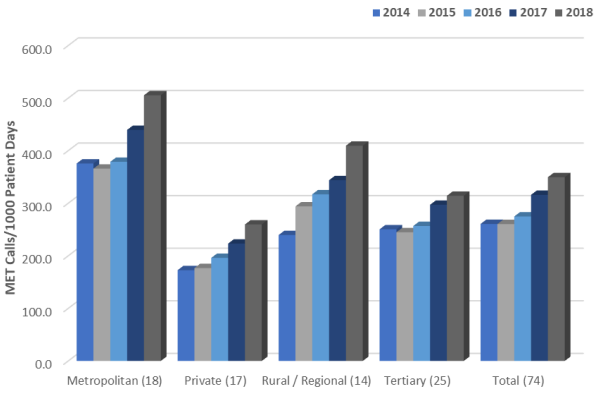
The RN Established FTE per 1000 patient days showed an increase of 1.5% despite the reported decrease in patient days.

The total vacancy rate for 2017/18 was 6.7%, slightly higher than the reported 5.5% for 2016/17.

Medical Emergency Teams

Met calls over 5 years are reported from 74 ICUs that consistently provided data for MET calls and bed days over that time. Figure 1 shows an increasing number of MET calls per 1000 patient days across all classifications over 5 years.

Figure 1 MET Calls per 1000 Patient Days over 5 years, by Classification

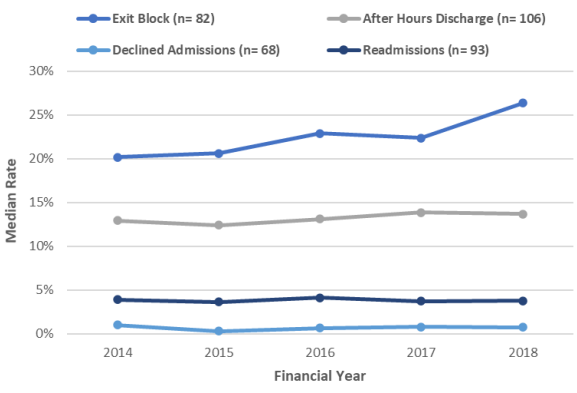


Data from 74 consistently contributing ICUs.

Readmissions, Declined Admissions, Exit Block and After Hours Discharge

Figure 2 shows the median rate of each clinical indicator over 5 years. Exit block showed an absolute increase in the median rate of 6.2%, whilst readmissions, declined admissions and after hours discharge remain relatively constant.

Figure 2 Clinical Indicators over 5 years



Consistently contributing ICUs for each clinical indicator (n= No. of ICUs).

Overview of CCR Survey

Introduction

The Critical Care Resources (CCR) Survey is one of four registries administered by the Australian and New Zealand Intensive Care Society (ANZICS) Centre for Outcome and Resource Evaluation (CORE), a not-for-profit organisation located in Melbourne, Australia. The other registries managed by ANZICS CORE are:

- The Adult Patient Database (APD) - collects data on adult admissions to ICUs,
- The Australian and New Zealand Paediatric Intensive Care (ANZPIC) Registry - collects data on ICU admissions of patients under the age of 16 years, and
- The Central Line Associated Blood Stream Infection (CLABSI) Surveillance Program - collects data on ICU CLABSI rates.

The CCR Survey has collected data on activity, resources and processes of care from Australian and New Zealand ICUs since 1993. Detail on the CCR Survey can be found at: https://www.anzics.com.au/critical-care-resources-ccr-registry/

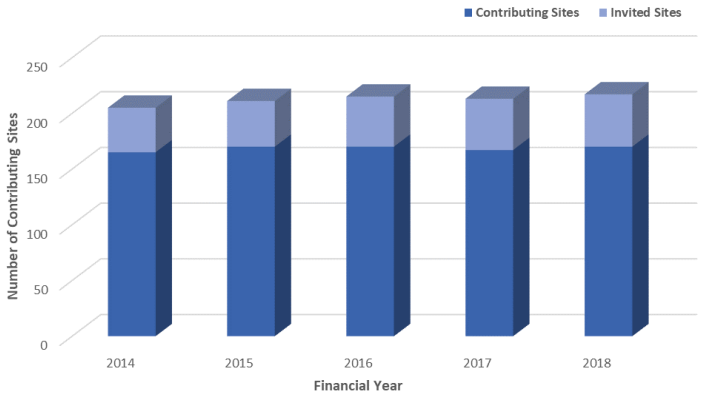
This report describes the changes in activity and bed numbers as reported in the 2017/18 CCR and comparative reporting over 5 years from ICUs who have consistently submitted data over this period. In 2017/18 there were 217 open ICUs in Australia and New Zealand. Overall, there were 2,482 available beds and 2,985 physical beds. All data included in this report were correct at the time of the survey.

Contribution to the 2017/18 CCR Survey

The 2017/18 CCR Survey had a response rate of 78% with 170/217 ICUs across Australia and New Zealand contributing to the survey.

Figure 3 shows that there has been a slight increase (5.8%) in the number of open ICUs and the response rate has remained relatively constant over the last 5 years.

Figure 3 Contribution to CCR over 5 years



For the analysis over time, only data from ICUs that consistently contributed to the survey for the years indicated were included. The number of contributing ICUs differs for each question. Where relevant the number of ICUs included in the analysis has been included with each graph throughout the report.

Unless otherwise indicated, standalone PICUs are included in the presented data.

Intensive Care Bed Stock

Physical Bed

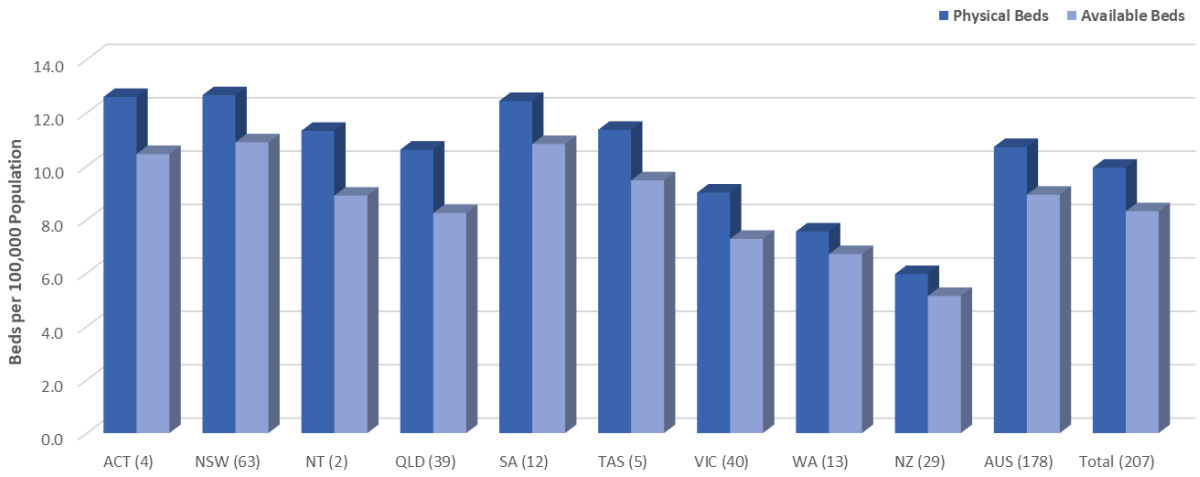
A single patient care location fully configured to ICU standards. It is an actual bed, not a bed space.

Available Bed

A bed with advanced life support capability that is fully staffed and funded.

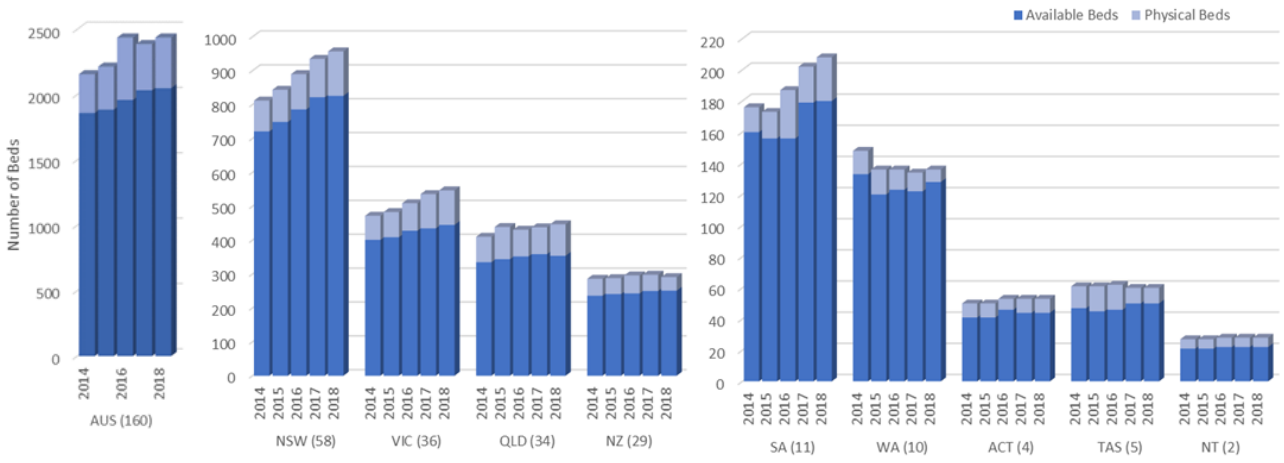
Distribution of Physical and Available ICU Beds

Figure 4 Physical and Available Beds per 100,000 Population in 2017/18, by Region



Data from ICUs that reported both available and physical beds.

Figure 5 Number of ICU Available and Physical beds over 5 years, by Region



Data from 189 consistently contributing ICUs that reported both available and physical beds.

Intensive Care Bed Stock *continued*

Table 1 Physical Beds in 2017/18, by Classification and Region

Hospital Classification	No. ICUs	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	NZ	Total
Metropolitan	33	8	128	18	52	25	14	110	33	36	424
Private	69	14	271		168	76	11	158	46	26	770
Rural / Regional	55		185	10	81		8	98	20	65	467
Tertiary	41	31	379		195	94	23	186	87	142	1137
PICU	9		48		36	13	4	40	10	22	173
Total	198	53	963	28	496	195	56	552	186	269	2798

Data from 2017/18 contributing ICUs and follow-up with non-contributors.

Table 2 Public and Private Beds in 2017/18, by Region

		Public			Private			Public Beds per 100,000 Population	
Region	**Population**	**No. ICUs**	**Physical Beds**	**Available Beds**	**No. ICUs**	**Physical Beds**	**Available Beds**	**Physical Beds**	**Available Beds**
ACT	420,960	2	39	30	2	14	14	9.3	7.1
NSW	7,988,241	43	740	605	20	271	265	9.3	7.6
NT	247,327	2	28	22				11.3	8.9
QLD	5,011,216	23	364	248	16	168	165	7.3	4.9
SA	1,736,422	5	132	104	7	84	84	7.6	6.0
TAS	528,201	4	49	39	1	11	11	9.3	7.4
VIC	6,460,675	25	422	312	158	164	158	6.5	4.8
WA	2,595,192	9	150	128	46	46	46	5.8	4.9
NZ	4,885,300	24	265	226	25	26	25	5.4	4.6
Total	29,873,534	137	2,189	1,714	768	784	768	7.3	5.7
AUS	24,988,234	113	1,924	1,488	743	758	743	7.7	6.0

Data from 2017/18 contributing ICUs and follow-up with non-contributors.

ICU Activity – Admissions and Discharges

Planned Admission

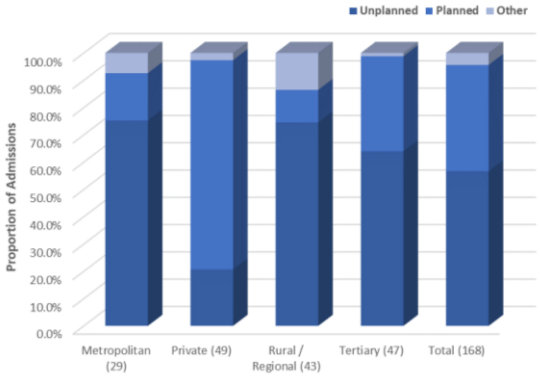
A planned admission to ICU/HDU. Post-surgical/procedure admissions are considered planned admissions when the need for admission was anticipated pre-operatively or prior to induction of anaesthesia. For non-surgical admissions, a planned admission should be considered as one that could be postponed for 24 hours with no adverse effect.

Unplanned Admission

An emergency admission to ICU/HDU for urgent care or treatment that could not be postponed without adverse effect. A postponed planned admission can subsequently become an unplanned or urgent admission.

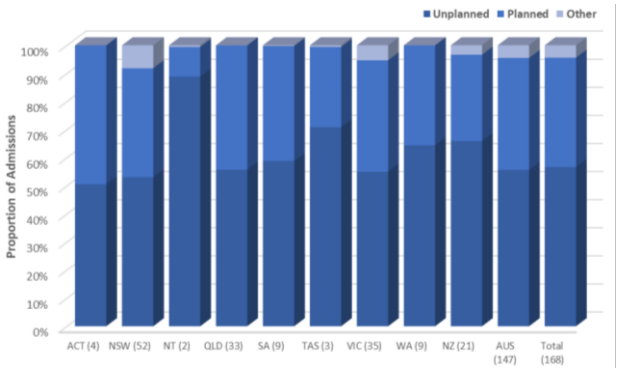
Patient Types

Figure 6 Proportion of Planned and Unplanned Admissions in 2017/18, by Classification



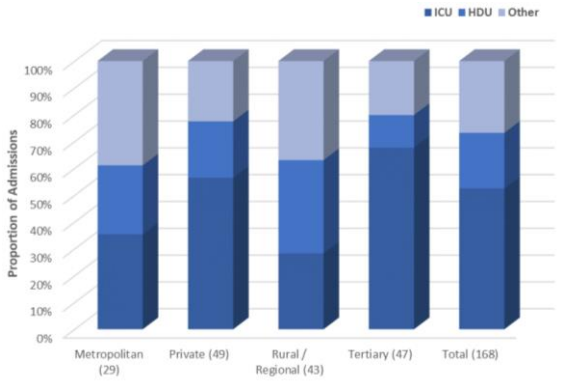
Data from 168 contributing ICUs.

Figure 7 Proportion of Planned and Unplanned Admissions in 2017/18, by Region



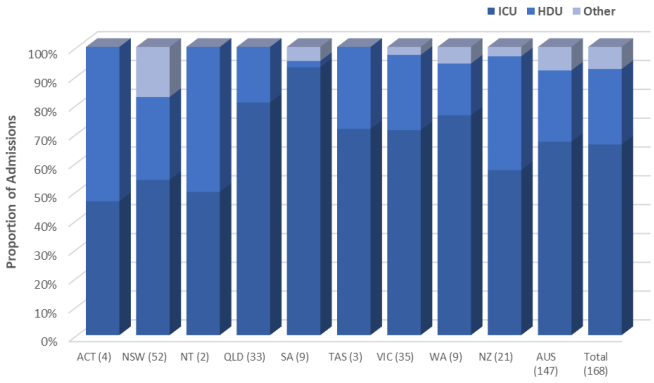
Data from 168 contributing ICUs.

Figure 8 Proportion of ICU and HDU Admissions in 2017/18, by Classification



Data from 168 contributing ICUs.

Figure 9 Proportion of ICU and HDU Admissions in 2017/18, by Region

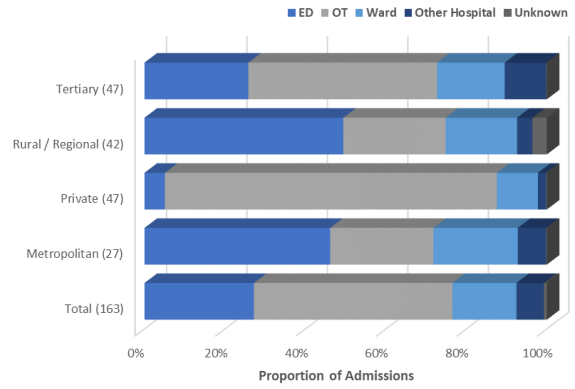


Data from 168 contributing ICUs.

ICU Activity - Admissions & Discharges *continued*

Source of Admissions

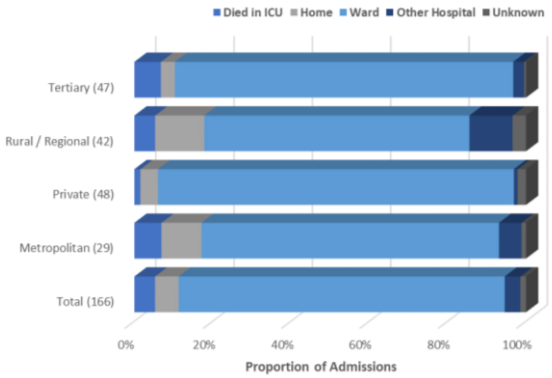
Figure 10 Source of Admission in 2017/18, by Classification



Data from 163 contributing ICUs.

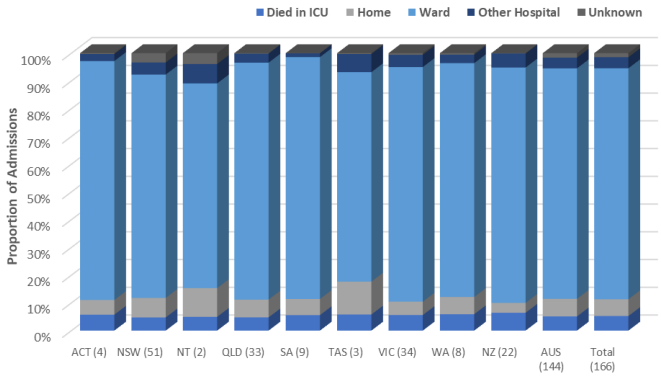
Destination at Discharge

Figure 11 Destination at ICU Discharge patients not discharged to the ward in 2017/18, by Classification



Data from 166 contributing ICUs.

Figure 12 Destination at ICU Discharge in 2017/18, by Region



Data from 166 contributing ICUs.

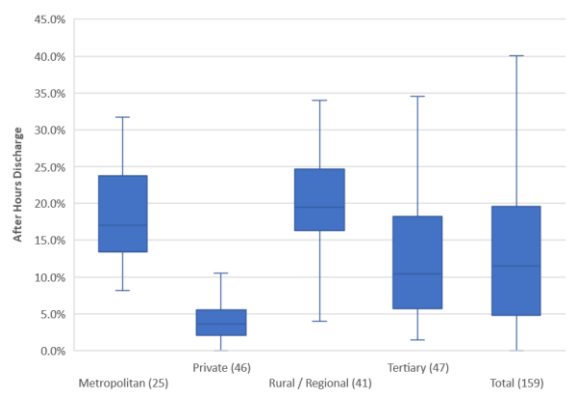
After Hours Discharge

After Hours Discharge

Discharge of a patient between 18:00 hours and 05:59 hours. Excludes patients that died in ICU or transferred to Other ICU or Other Hospital.

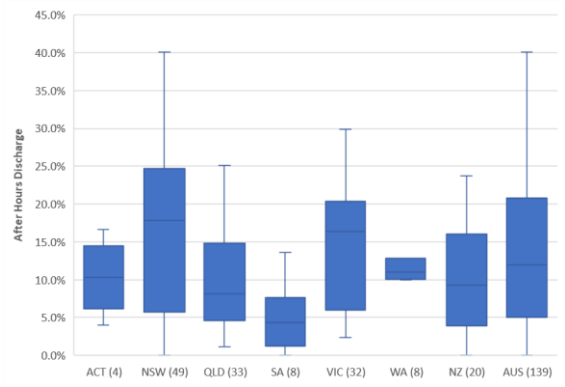
In 2017/18, 159 ICUs reported after hours discharge data showing an overall after hours discharge rate of 13.4%.

Figure 13 Median and IQR Unit After Hours Discharge Rate in 2017/18, by Classification



Data from 159 contributing ICUs.

Figure 14 Median and IQR Unit After Hours Discharge Rate in 2017/18, by Region



Data from 159 ICUs. NT (2) and TAS (3) excluded for individual reporting to avoid identification of individual ICUs.

Readmissions

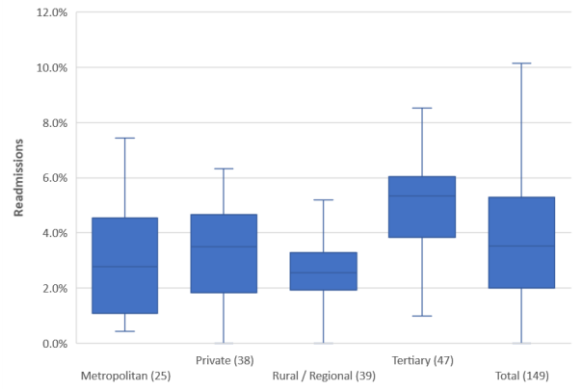
Readmission

Any second or subsequent admission to ICU/HDU within the same hospital admission, excluding direct transfers to or from ICU/HDU.

Readmission includes all readmissions; it is not equivalent to the ACHS indicator “readmissions within 72 hours”.

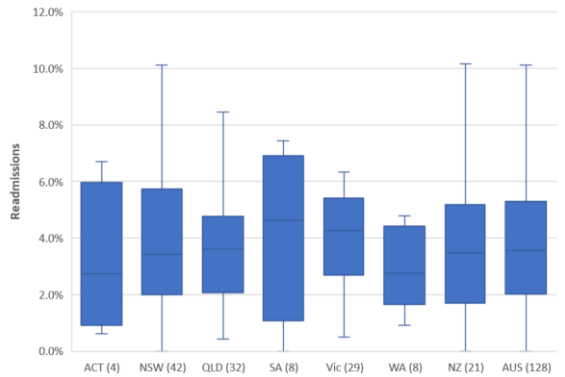
In 2017/18, 149 ICUs reported readmission data showing an overall patient readmission rate of 4.6%.

Figure 15 Median and IQR Unit Readmission Rate in 2017/18, by Classification



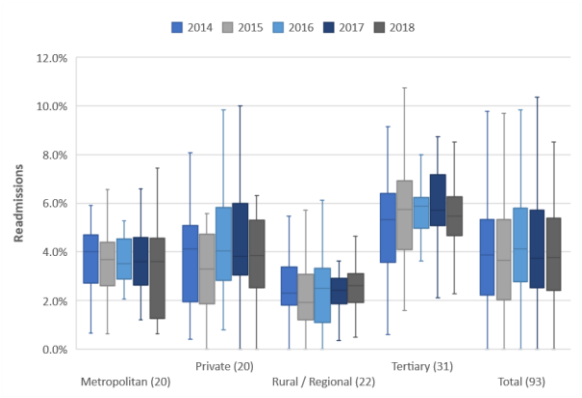
Data from 149 ICUs.

Figure 16 Median and IQR Unit Readmission Rate in 2017/18, by Region



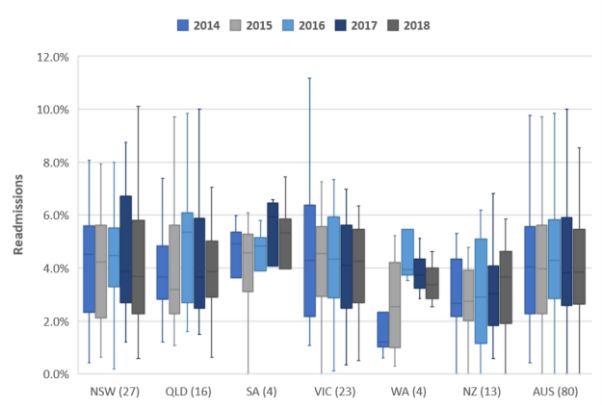
Data from 149 ICUs. NT (2) and TAS (3) excluded for individual reporting to avoid identification of individual ICUs.

Figure 17 Median and IQR Unit Readmission Rates over 5 years, by Classification



Consistently contributing ICUs.

Figure 18 Median and IQR Unit Readmission Rates over 5 years, by Region



Consistently contributing ICUs. ACT (2), NT (2) and TAS (2) excluded for individual reporting to avoid identification of individual ICUs.

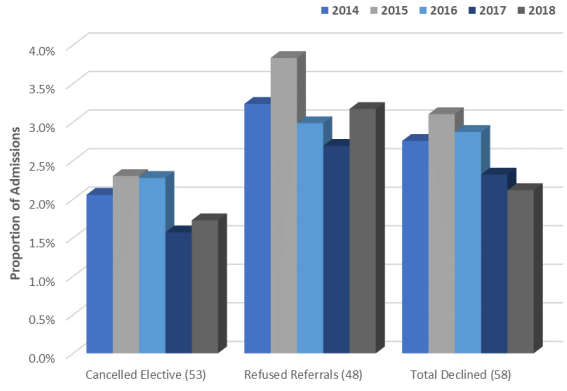
Trend in Declined Admissions

Declined Admissions

The CCR Survey collects two variables on declined admissions; declined elective surgery admissions due to inadequate ICU resources and declined unplanned admissions due to inadequate resources.

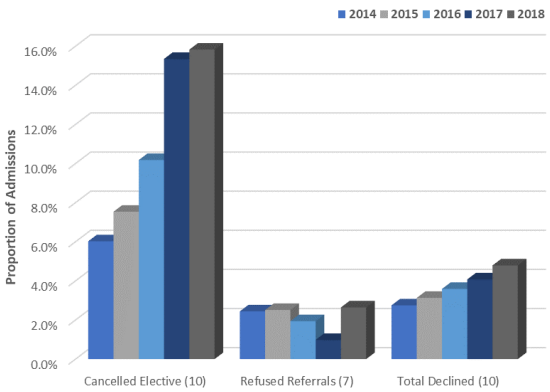
Declined elective surgery admissions due to inadequate resources are calculated as a proportion of planned admissions to ICU and declined unplanned admissions due to inadequate resources as a proportion of unplanned admissions to ICU. The two data point are combined to calculate an overall declined admission rate as a proportion of total ICU admissions.

Figure 19 Overall Declined Admission Rate in Australia over 5 years



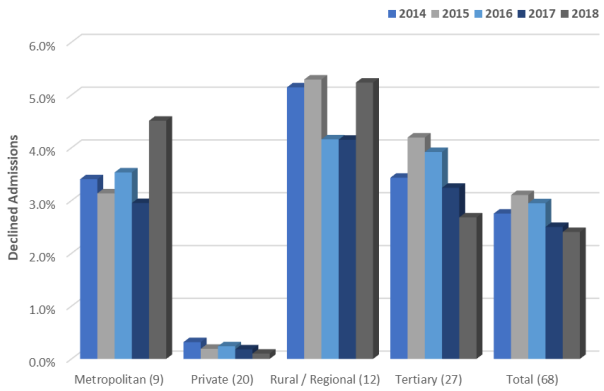
Consistently contributing ICUs only. Number of ICUs for each group in brackets.

Figure 20 Overall Declined Admission Rate in New Zealand over 5 years



Consistently contributing ICUs only. Number of ICUs for each group in brackets.

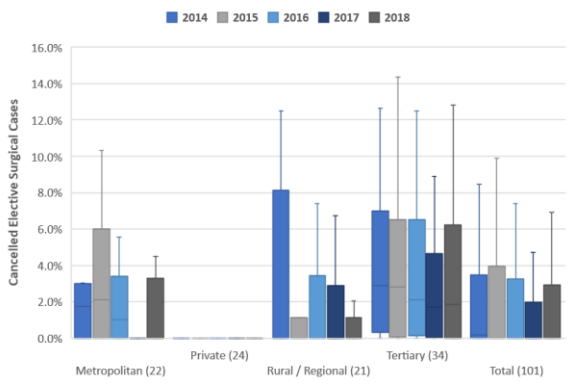
Figure 21 Overall Declined Admission Rate over 5 years, by Classification



Consistently contributing ICUs only. Number of ICUs for each group in brackets.

Declined Elective Surgery Admissions Due to Inadequate Resources

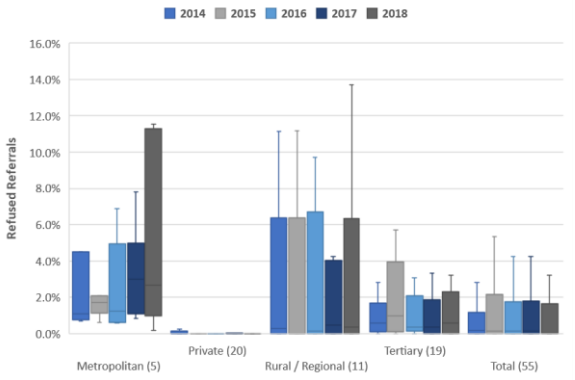
Figure 22 Median and IQR Cancelled Elective Surgery Rate over 5 years, by Classification (IQR)



Consistently contributing ICUs.

Declined Unplanned Admissions Due to Inadequate Resources

Figure 23 Median and IQR Refused Referral Rate over 5 years, by Classification



Consistently contributing ICUs.

ICU Activity – Patient Bed Days and Occupancy

Patient Bed Days

The total number of days for patients who were admitted to the ICU/HDU for an episode of care. Calculated as the difference between the ICU/HDU separation date and ICU/HDU admission date. Same day patients are allocated a length of stay of one day.

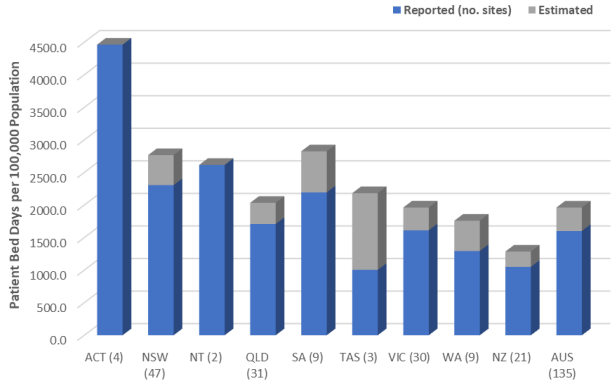
Occupancy

Calculated by dividing total bed days in a period by the product of the available beds and the days in the period.

The estimated total bed days per 100,000 population is calculated as the proportion of available beds reported.

Patient Bed Days

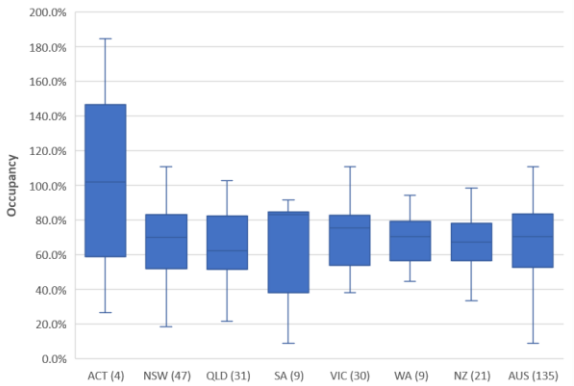
Figure 24 Patient Bed Days per 100,000 population in 2017/18, by Region



Data from 156 ICUs.

Occupancy

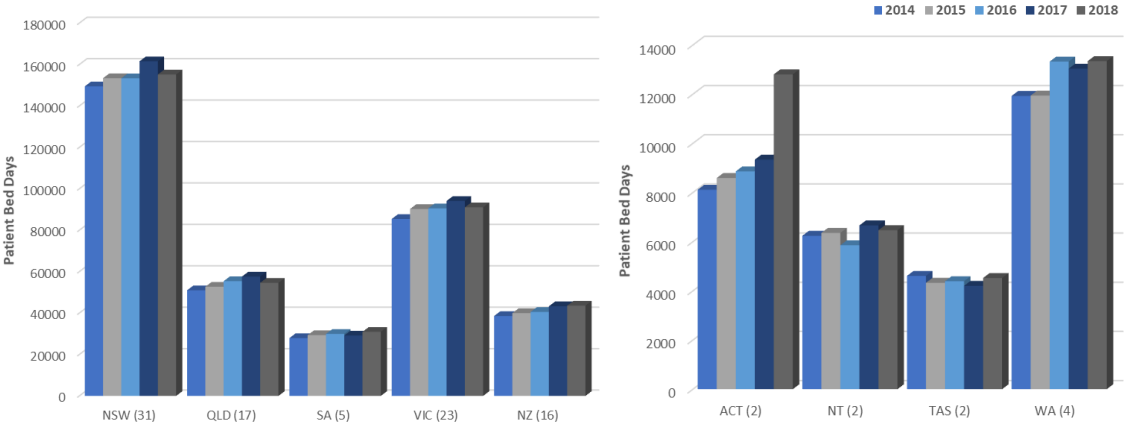
Figure 25 Median and IQR Unit Occupancy in 2017/18, by Region



NT (2) and TAS (3) excluded for individual reporting to avoid identification of individual ICUs.

Trend in Patient Bed Days

Figure 26 Patient Bed Days over 5 years, by Region



Consistently contributing ICUs.

ICU Activity – Patient Bed Days and Occupancy *continued*

After Hours Discharge and Occupancy

Figure 27 Scatter Plot of Occupancy versus After Hours Discharge over 5 years

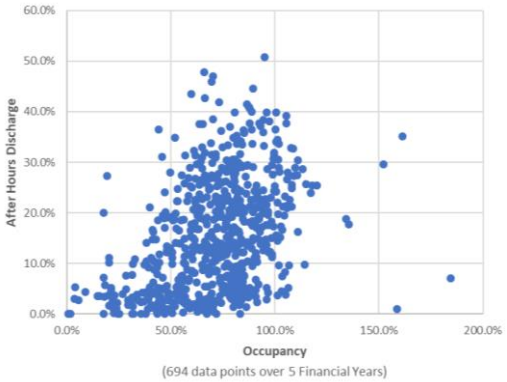


Figure 27 shows that a higher occupancy rate within a unit correlates with a higher rate of after hours discharge.

Declined Admission and Occupancy

Figure 28 Scatter Plot of Occupancy versus Declined Admissions over 5 years

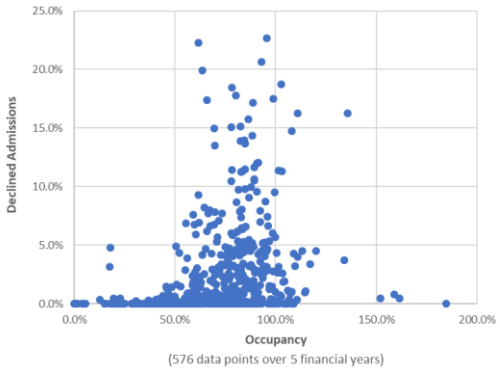


Figure 28 shows that a higher occupancy rate within a unit correlates with a higher rate of declined admissions.

Ventilation

Rates of Ventilation

Rates of ventilation are calculated as the number of ventilated patients as a proportion of all admissions.

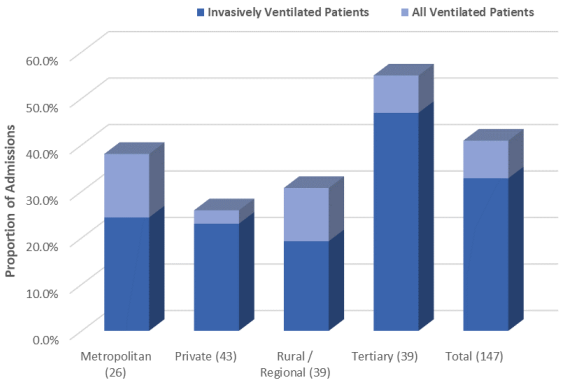
Non-Invasive Ventilation

Ventilatory support such as CPAP/BiPAP, administered via facial or nasal mask or nasal cannulae.

Invasive Ventilation

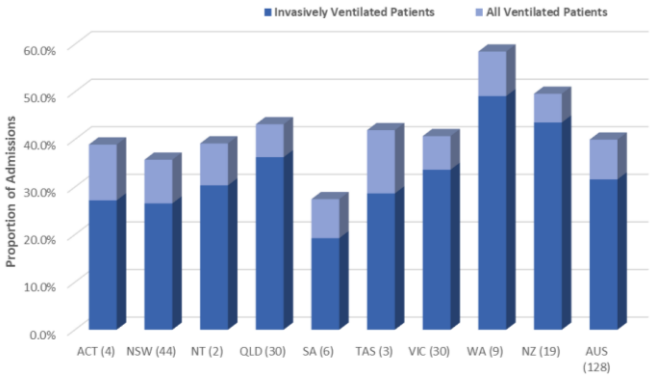
Mechanical ventilator support via oral/nasal intubation or tracheostomy tube.

Figure 29 Ventilation Rate in 2017/18, by Classification



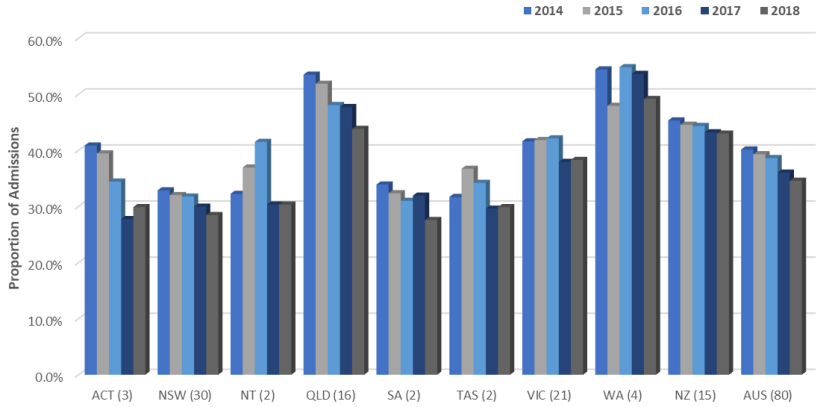
Data from 147 ICUs.

Figure 30 Ventilation Rate in 2017/18, by Region



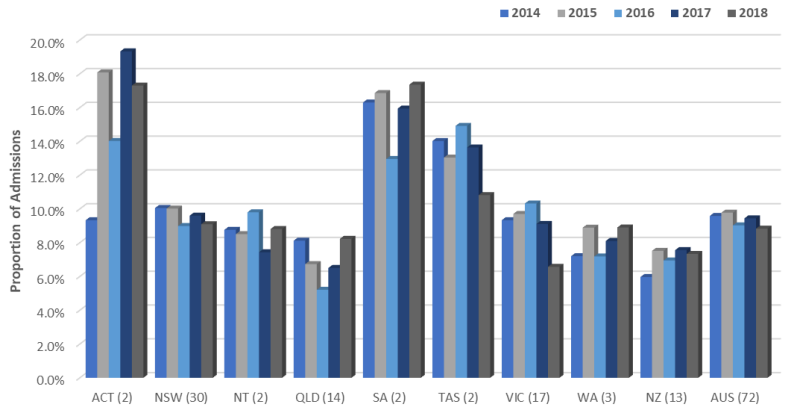
Data from 147 ICUs.

Figure 31 Total Rate of Invasive Ventilation over 5 years, by Region



Data from 95 consistently contributing ICUs.

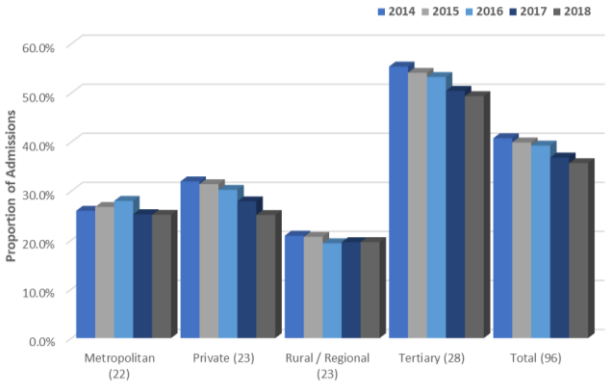
Figure 32 Total Rate of Non-Invasive Ventilation (only) over 5 years, by Region



Data from 85 consistently contributing ICUs.

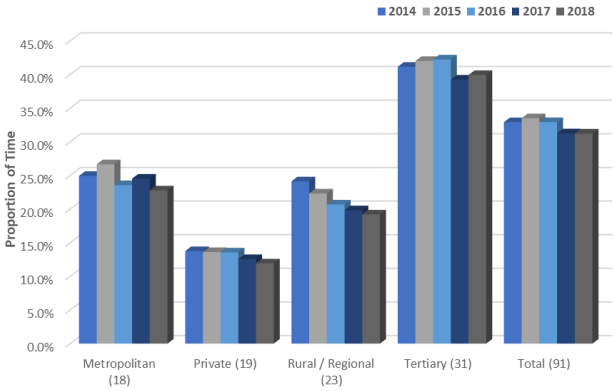
Ventilation *continued*

Figure 33 Total Rate of Invasive Ventilation over 5 years, by Classification



Consistently contributing ICUs.

Figure 34 Duration of Invasive Ventilation over 5 years, by Classification

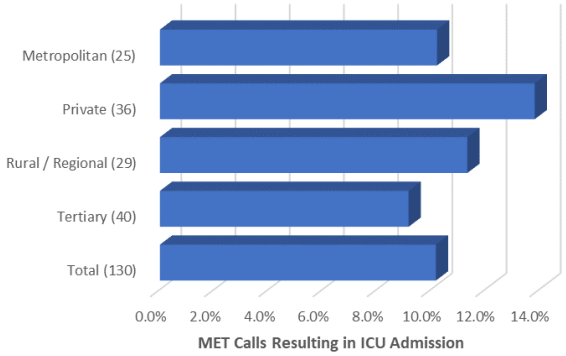


Consistently contributing ICUs.

Recognition and Response to Clinical Deterioration

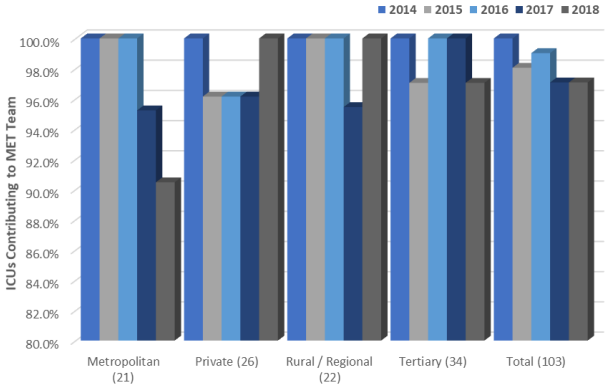
In 2017/18, 158 ICUs reported to have an active hospital MET service of which 126 ICUs (80%) are managed by the ICU.

Figure 35 Proportion of MET Calls Resulting in ICU Admissions in 2017/18, by Classification



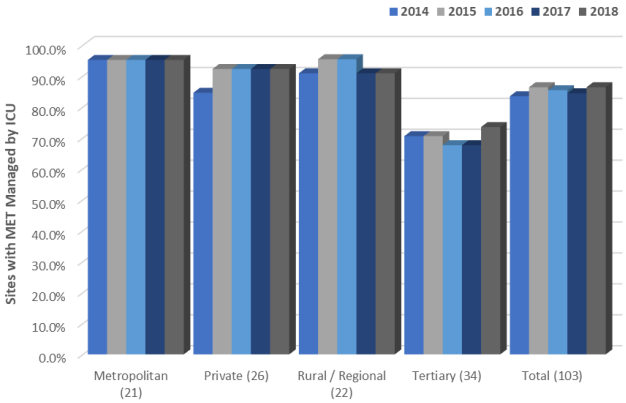
Data from 130 ICUs.

Figure 36 Proportion of ICUs Contributing ICU Staff to MET Service over 5 years, by Classification



Data from 103 ICUs.

Figure 37 Proportion of MET Service Managed by ICUs over 5 years, by Classification



Data from 103 consistently contributing ICUs.

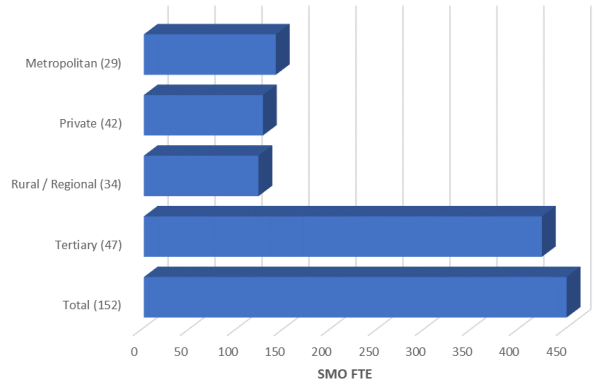
Workforce - Senior Medical Staff

Senior Medical Officer
Intensive care specialists and non-intensive care specialists.

Full Time Equivalent
A unit that indicates the workload of an employed person that makes workloads comparable across various contexts.

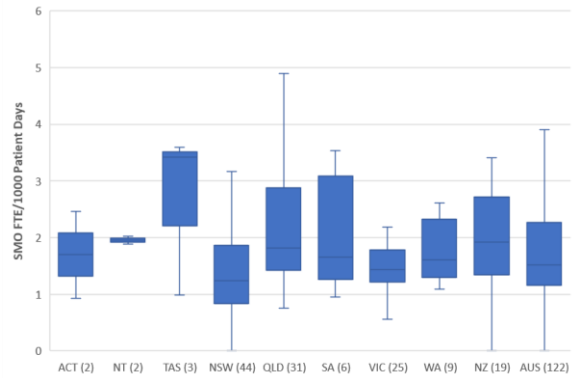
Total Established Full Time Equivalent (FTE)
Includes the vacant positions reported for the year.

Figure 38 Total Established SMO FTE in 2017/18, by Classification



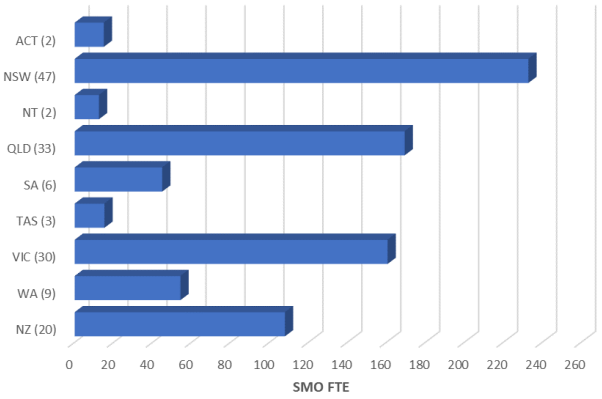
Data from 152 ICUs.

Figure 39 Median and IQR Established SMO FTE per 1000 Patient Days in 2017/18, by Region



Data from 141 ICUs. ACT (2), NT (2) and TAS (3) excluded for individual reporting to avoid identification of individual ICUs.

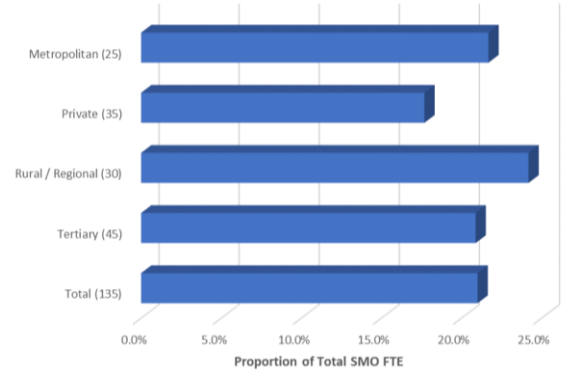
Figure 40 Total Established SMO FTE in 2017/18, by Region



Data from 152 ICUs.

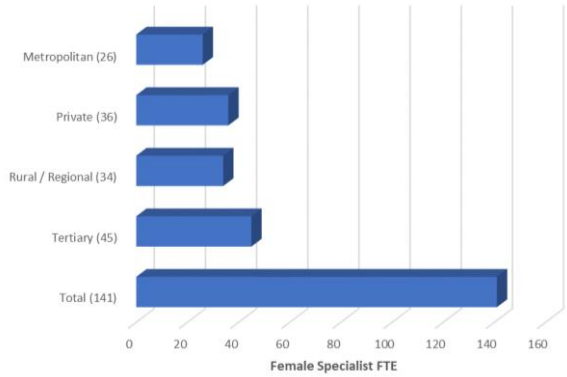
Female Specialists

Figure 41 Proportion of Female Specialists (FTE) in 2017/18, by Classification



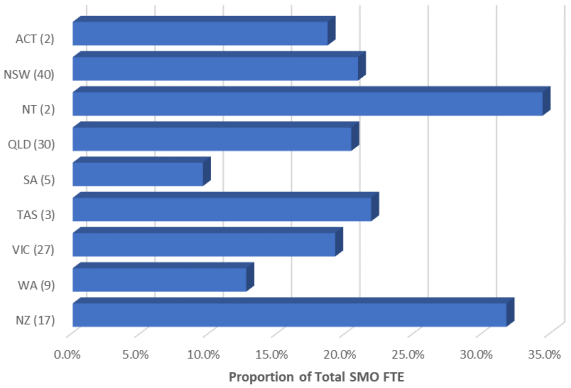
Data from 135 ICUs.

Figure 42 Female Specialists (FTE) in 2017/18, by Classification



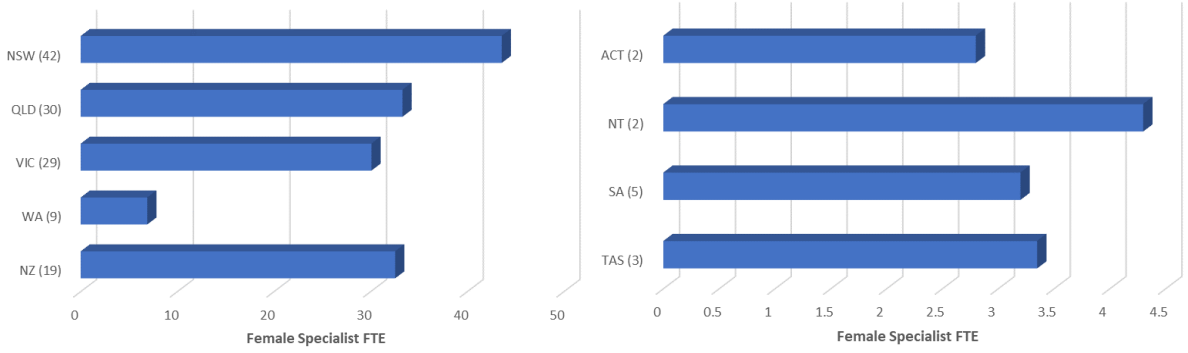
Data from 141 ICUs.

Figure 43 Proportion of Female Specialists (FTE) in 2017/18, by Region



Data from 135 ICUs.

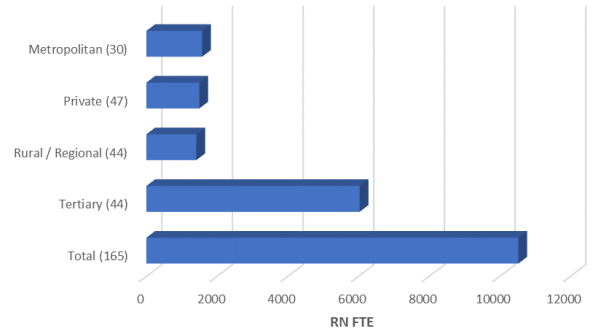
Figure 44 Female Specialists (FTE) in 2017/18, by Region



Data from 141 ICUs.

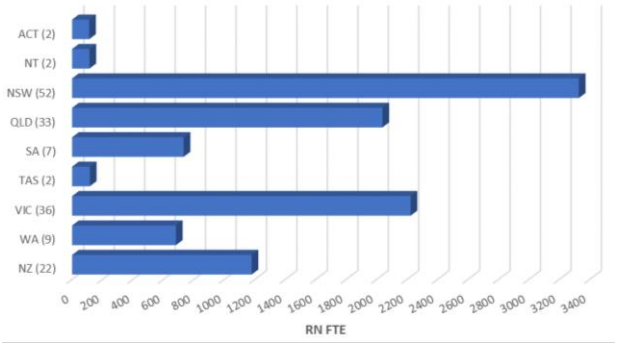
Workforce - Registered Nurse

Figure 45 Total RN FTE in 2017/18, by Classification



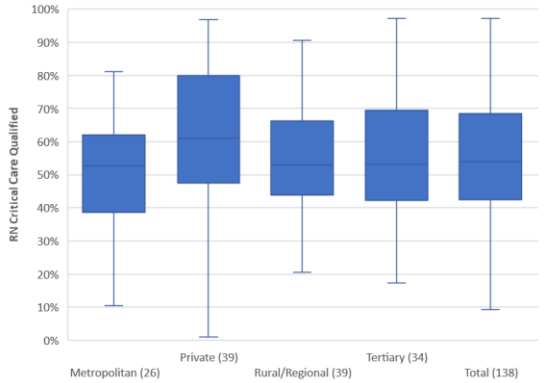
Data from 165 ICUs.

Figure 46 Total RN FTE in 2017/18, by Region



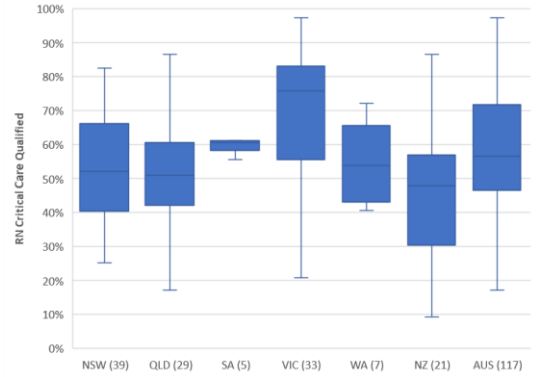
Data from 165 ICUs.

Figure 47 Median and IQR RN with Critical Care Qualification in 2017/18, by Classification



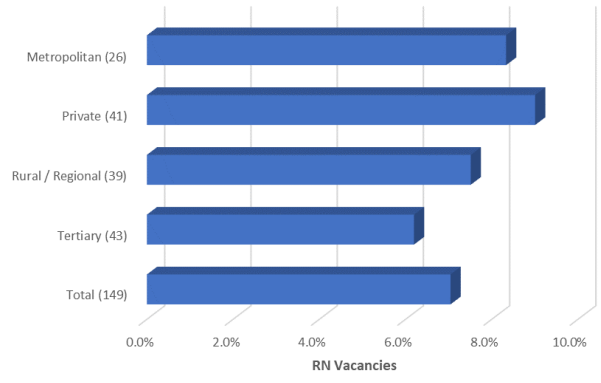
Data from 138 ICUs.

Figure 48 Median and IQR RN with Critical Care Qualification in 2017/18, by Region



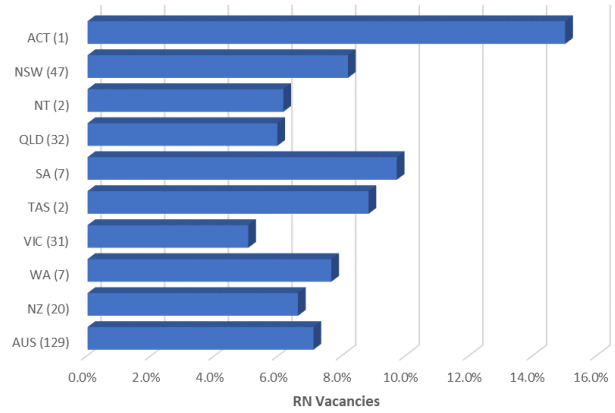
Data from 138 ICUs. NT (2) and TAS (3) excluded for individual reporting to avoid identification of individual ICUs. ACT did not contribute data.

Figure 49 RN Vacancy Percentage in 2017/18, by Classification



Data from 149 ICUs.

Figure 50 RN Vacancy Percentage in 2017/18, by Region



Data from 149 ICUs.

Safety and Quality

Table 3 Total FTE Allocated to Research Activity in 2017/18, by Classification

Research Infrastructure	Metropolitan Total FTE (No. ICUs)	Private Total FTE (No. ICUs)	Rural/Regional Total FTE (No. ICUs)	Tertiary Total FTE (No. ICUs)
Medical FTE Allocated to Coordinating ICU activities	7.4 (24)	5.4 (35)	3.2 (29)	16 (38)
Hospital Funded Research Co-ordinator FTE	6.8 (24)	2.5 (38)	3.2 (31)	22.6 (43)
Independently Funded Research Co-ordinator FTE	2.9 (23)	1.2 (38)	1.6 (30)	50.4 (42)

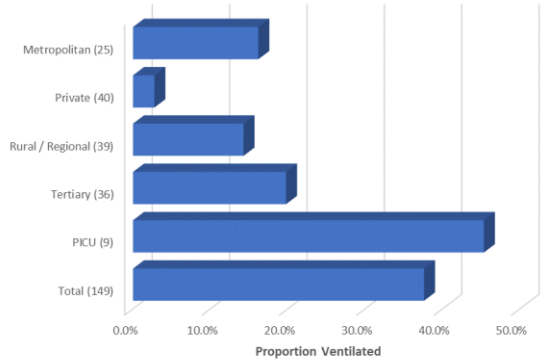
Table 4 Proportion of Responses for Safety and Quality Activities in 2017/18, by Classification

Safety and Quality Activity	Metropolitan % ICUs Reporting Yes (No. ICUs)	Private % ICUs Reporting Yes (No. ICUs)	Rural/Regional % ICUs Reporting Yes (No. ICUs)	Tertiary % ICUs Reporting Yes (No. ICUs)
Process orientated checklists (e.g. FASTHUG)	87% (30)	66% (47)	86% (43)	73% (45)
Rounds conducted with infectious diseases specialist	90% (30)	31% (45)	54% (43)	98% (45)
Rounds conducted with a pharmacist	93% (30)	45% (47)	75% (44)	89% (45)
Rounds conducted with a pharmacist daily	100% (28)	77% (22)	79% (33)	95% (40)

Paediatric Intensive Care

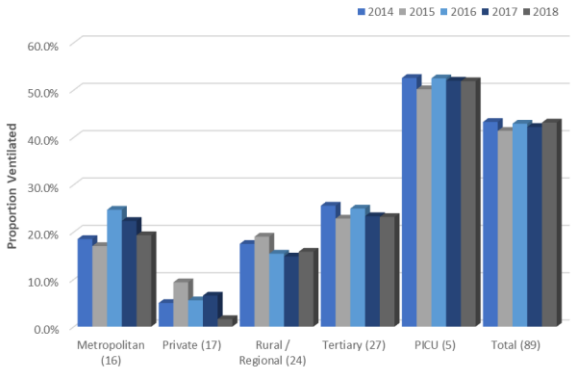
Ventilation

Figure 51 Paediatric Ventilation in 2017/18, by Classification



Data from 149 ICUs. PICUs separated from Tertiary ICUs.

Figure 52 Paediatric Ventilation between 2013/14 and 2017/18, by Classification



Data from 89 consistently contributing ICUs. PICUs separated from Tertiary ICUs.

Bed Stock

Table 5 Physical and Available PICU Beds per 100,000 Paediatric Population in 2017/18

Region	Paediatric Population	Physical Beds	Available Beds	Physical Beds/100,000 Paediatric Population	Available Beds/100,000 Paediatric Population
ACT	84,286				
NSW	1,575,973	48	42	3.0	2.7
NT	56,504				
QLD	1,040,508	36	26	3.5	2.5
SA	326,434	13	7	4.0	2.1
TAS	99,601	4	4	4.0	4.0
VIC	1,256,792	40	28	3.2	2.2
WA	537,198	10	10	1.9	1.9
NZ	944,600	22	18	2.3	1.9
Total	5,921,896	173	135	2.9	2.3
AUS Total	4,977,296	151	117	3.0	2.4

Data from 9 PICUs. Overall 2.92 physical beds/100,000 paediatric population and 2.28 available beds/100,000 paediatric population.

Admissions and Beds

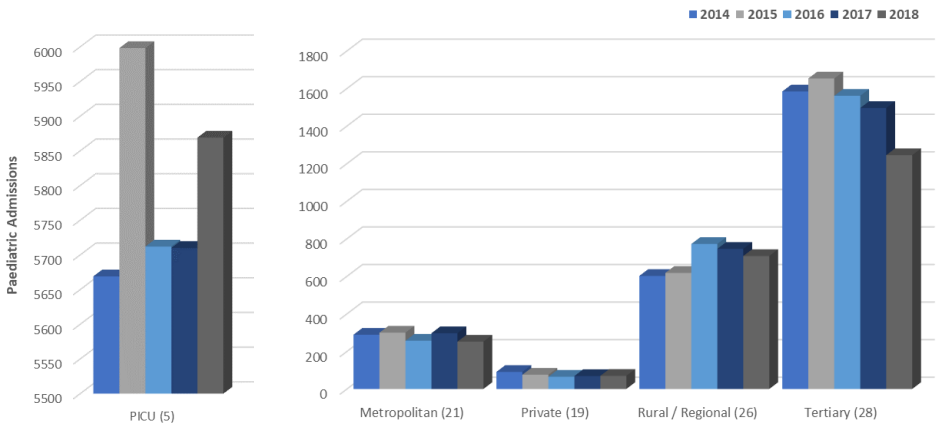
Table 6 Paediatric Intensive Care Admissions in 2017/18, by Region

Region	PICU Beds		Paediatric Admissions			Paediatric Admissions/100,000 Paediatric Population
	Physical	Available	Non-PICU Admissions	PICU Admissions	Total Admissions	
ACT			49		49	58.1
NSW	48	42	685	2,290	2,975	188.8
NT			72		72	127.4
QLD	36	26	1,012	1,966	2,978	286.2
SA	13	7	33	505	538	164.8
TAS	4	4	35	177	212	212.8
VIC	40	28	377	2,159	2,536	201.8
WA	10	10	42	769	838	156.0
NZ	22	18	1,114	1,105	2,219	234.9
Total	173	135	3,419	8,998	12,417	209.7
AUS Total	151	117	2,305	7,893	10,198	204.9

Data from 9 PICUs and 145 ICUs.

Five Year Trend in Admissions

Figure 53 Paediatric Admissions over 5 years, by Classification



Consistently contributing ICUs. Data from 5 PICUs and 94 ICUs.

Appendix 1 – CCR Survey Methodology

Survey Instrument

The online survey was sent to 217 ICUs in Australia and New Zealand in October 2018 with the return of surveys accepted until late January 2019. Follow up of non-submitted surveys was by email and telephone.

Data Quality

The survey is reliant on self-reporting by staff members at the contributing ICUs. To assist with this process, supporting documents were provided to assist contributors in understanding key terms and to provide the framework for determining ICU levels. Where applicable, CCR endeavours to follow definitions listed in the National Health Data Dictionary.

Submitted data was checked and any identified issues or discrepancies, both within each survey and relating to answers provided in previous surveys, confirmed with the survey contact nominated by the ICUs. Not all questions were answered by all ICUs, and despite follow-up of missing data, questions remain unanswered for various reasons. To account for this, the number of contributing ICUs is indicated in each section below.

Data Analysis

The online survey tool enters data into a Microsoft SQL server database. Data extraction and analysis was undertaken with Microsoft SQL server and Microsoft Excel.

Presentation of Data

Data is presented in tables and various types of graphs. Data presented is for the 2017/18 financial year (1 July 2017 to 30 June 2018), unless otherwise stated. Box and whisker plots represent the range, interquartile range and median, unless specifically indicated otherwise. Effort has been taken to avoid identifying individual ICUs, see notes below each graph for details.

Data Items

Extensive data relating to the resources and activity of ICUs in Australia and New Zealand is collected by the CCR survey, however, to ensure only the most relevant information is presented, not all data items are presented in this report. The data not presented here includes Clinical Indicators and staffing models but is available upon request from ANZICS CORE. Please complete an information request form available here: https://www.anzics.com.au/data-access-and-publication-policy/

Comparison Groups

This report separates ICUs into two types of comparison groups; region and classification. The location of ICUs in Australia and New Zealand is separated into nine regions; eight states and territories in Australia, and New Zealand as one region. ICUs are classified as one of four hospital classifications; Tertiary, Metropolitan, Rural/Regional and Private. In the paediatric section - PICUs are separated from other Tertiary ICUs. Classification is determined by various factors, including geographical location and patient case mix. Effort is taken to align classifications across all ANZICS CORE registries.

Information on the level and type of ICU was also collected in the survey, but not used as a comparison for the purpose of this report.

ICU Beds

For the purposes of the CCR Survey, beds are categorised as general ICU, other ICU and High Dependency Unit (HDU). Coronary Care Unit (CCU) beds were collected and explicitly excluded.

Physical and Available Beds can be described in any category of bed, however ventilator beds can only be described in general ICU and other ICU categories. For the purpose of this report, beds are reported as physical and available, and not broken down by category.

ICU Activity

The CCR Survey collects data relating to Adult and Paediatric patient admissions to an ICU, including admissions, bed days, readmissions, admission source, discharge destination, patient ventilation and activity indicators. Definitions of these activities are detailed in the respective sections of this report.

Intensive Care Workforce

Data is collected on medical, nursing and allied health staff within ICUs and reported in the workforce section. Extensive data is collected profiling both medical and nursing staff, however for the purposes of this report details of staffing models have not been included but are available upon request from ANZICS CORE. Please complete an information request form available here: https://www.anzics.com.au/data-access-and-publication-policy/

Changes over Time

In addition to reporting on the 2017/18 financial year, this report makes comparisons against previous survey years. As different ICUs submitted surveys each year, the time series analysis includes only data from ICUs that consistently submitted a survey in all the years in question. This was done to prevent differences in the combination of ICUs masking any trends in changed resources of activity over time. The number of ICUs included in each time series analysis is indicated in each section.

Population

For analysis of data in relation to population, estimated population data at the end of June 2018 financial year was used. Data was obtained from the Australian Bureau of Statistics and Statistics New Zealand. Population was 24,988,234 for Australia and 4,885,300 for New Zealand.

Sources:
http://stat.data.abs.gov.au/index.aspx?DatasetCode=ERP_QUARTERLY

https://www.stats.govt.nz/information-releases/national-population-estimates-at-30-june-2018

Appendix 2 - ICU Bed Stock

Regional Spread of ICU Beds in Australia and New Zealand 2017/18

- Australia – 209 ICUs (General ICU and PICUs), 2,694 physical beds and 2,231 available beds
- New Zealand – 30 ICUs (General ICU and PICUs), 291 physical beds and 251 available beds

Table 7 Available Beds in 2017/18, by Hospital Classification and Region

Hospital Classification	No. ICUs	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	NZ	Total
Metropolitan	33	8	114	12	34	14	11	68	29	29	319
Private	68	14	265		165	76	11	152	46	25	754
Rural / Regional	54		148	10	54		8	66	20	58	364
Tertiary	41	22	301		134	83	16	150	69	121	896
PICU	9		42		26	7	4	28	10	18	135
Total	205	44	870	22	413	180	50	464	174	251	2,468

2017/18 contributing ICUs and follow-up with non-contributors. Data from 205 ICUs.

Table 8 Available Beds over 5 years, by Region

Region	2013/14 (n=207)	2014/15 (n=211)	2015/16 (n=215)	2016/17 (n=213)	2017/18 (n=207)
ACT	41	41	46	44	44
NSW	774	814	867	884	870
NT	21	21	22	22	22
QLD	382	391	408	420	413
SA	176	168	160	179	188
TAS	47	45	46	50	50
VIC	422	436	460	482	470
WA	152	156	171	166	174
NZ	242	247	249	256	251
Total	2,257	2,319	2,429	2,503	2,482
AUS Total	2,015	2,072	2,180	2,247	2,231

Contributing ICUs and follow-up with non-contributors. Number of ICUs that reported available beds data per financial year in brackets.

Table 9 Physical Beds over 5 years, by Region

Region	2013/14 (n=207)	2014/15 (n=211)	2015/16 (n=215)	2016/17 (n=213)	2017/18 (n=209)
ACT	50	50	53	53	53
NSW	867	913	983	1010	1011
NT	27	27	28	28	28
QLD	470	498	496	510	532
SA	195	185	191	202	216
TAS	61	61	62	60	60
VIC	495	519	550	591	598
WA	167	186	200	194	196
NZ	292	294	302	304	291
Total	2,624	2,733	2,865	2,952	2,985
AUS Total	2,332	2,439	2,563	2,648	2,694

Contributing ICUs and follow-up with non-contributors. Number of ICUs that reported available beds data per financial year in brackets.

Appendix 2 - ICU Bed Stock *continued*

Table 10 Physical and Available Beds per 100,000 Population in 2017/18

Region	Population	No. ICUs	Physical Beds	Available Beds	Available as % of Physical	Physical Beds/100,000 Population	Available Beds/100,000 Population
ACT	420,960	4	53	44	83.0%	12.6	10.5
NSW	7,988,241	63	1011	861	85.2%	12.7	10.8
NT	247,327	2	28	22	78.6%	11.3	8.9
QLD	5,011,216	39	532	420	78.9%	10.6	8.4
SA	1,736,422	12	216	179	82.9%	12.4	10.3
TAS	528,201	5	60	50	83.3%	11.4	9.5
VIC	6,460,675	40	582	450	77.3%	9.0	7.0
WA	2,595,192	13	196	166	84.7%	7.6	6.4
NZ	4,885,300	29	291	250	85.9%	6.0	5.1
Total	29,873,534	207	2,969	2,442	82.2%	9.9	8.2
AUS Total	24,988,234	178	2,678	2,192	81.9%	10.7	8.8

Data from 207 ICUs that reported both physical and available beds. 2017/18 contributing ICUs and follow-up with non-contributors.

Table 11 Physical and Available Adult Beds per 100,000 Adult Population in 2017/18

Region	Adult Population	No. ICUs	Physical Beds	Available Beds	Available as % of Physical	Physical Beds/100,000 Population	Available Beds/100,000 Population
ACT	336,674	4	53	44	83.0%	15.7	13.1
NSW	6,412,268	61	963	823	85.5%	15.0	12.8
NT	190,823	2	28	22	78.6%	14.7	11.5
QLD	3,970,708	38	496	392	79.0%	12.5	9.9
SA	1,409,988	10	195	166	85.1%	13.8	11.8
TAS	428,600	4	56	46	82.1%	13.1	10.7
VIC	5,203,883	37	536	422	78.7%	10.3	8.1
WA	2,057,994	12	186	160	86.0%	9.0	7.8
NZ	3,940,700	28	269	233	86.6%	6.8	5.9
Total	23,951,638	196	2,782	2,308	83.0%	11.6	9.6
AUS Total	20,010,938	168	2,513	2,075	82.6%	12.6	10.4

Data from 196 ICUs that reported both physical and available beds. 2017/18 contributing ICUs and follow-up with non-contributors.

Appendix 3 – ICU Admissions

Table 12 Number of Admissions in 2017/18, by Classification

Hospital Classification	No. ICUs	Total Admissions	Unplanned Admissions	Planned Admissions	Undivided Admissions
Metropolitan	32	29,036	19,204	4,434	1,891
Private	66	61,418	9,161	34,029	1,177
Rural / Regional	52	37,533	21,472	3,436	3,897
Tertiary	50	86,773	52,925	28,848	1,016
Total	200	214,760	102,762	70,747	7,981

Data from 200 ICUs. Not all ICUs reported a breakdown of admissions.

Table 13 Number of Admissions in 2017/18, by Region

Region	No. ICUs	Total Admissions	Unplanned Admissions	Planned Admissions	Undivided Admissions
ACT	4	4,623	2,336	2,287.0	0
NSW	62	72,376	33,894	24,798.0	5,223
NT	2	1,816	1,613	192.0	11
QLD	39	35,114	16,968	13,499.0	4
SA	12	16,178	6,725	4,684.0	30
TAS	4	3,217	1,199	484.0	10
VIC	40	44,753	21,856	15,743.0	2,120
WA	12	14,962	6,785	3,750.0	2
NZ	25	21,721	11,386	5,310.0	581
Total	200	214,760	102,762	70,747.0	7,981
AUS Total	175	193,039	91,376	65,437	7,400

Data from 200 ICUs. Not all ICUs reported a breakdown of admissions.

Table 14 Admissions/100,000 Population in 2017/18, by Region

Region	No. ICUs	Population	Reported Admissions / Population	% Beds Represented	Estimated Total Admissions / Population
ACT	4	420,960	1,098.2	100.0%	1098.2
NSW	62	7,988,241	906.0	99.3%	912.3
NT	2	247,327	734.3	100.0%	734.3
QLD	39	5,011,216	700.7	100.0%	700.7
SA	12	1,736,422	931.7	100.0%	931.7
TAS	4	528,201	609.0	78.0%	780.8
VIC	40	6,460,675	692.7	97.2%	712.4
WA	12	2,595,192	576.5	91.4%	630.9
NZ	25	4,885,300	444.6	92.4%	481.0
Total	200	29,873,534	718.9	97.4%	737.9
AUS Total	175	24,988,234	772.5	98.0%	788.4

Data from 200 ICUs.

Appendix 4 – ICU Bed Days

Bed Days

Table 15 Total Bed Days in 2017/18, by Classification

Hospital Classification	Total Bed Days		Unplanned and Planned Bed Days			
	No. ICUs	Total Bed Days	No. ICUs	Unplanned Bed Days	Planned Bed Days	% Unplanned Bed Days
Metropolitan	27	70,963	23	49,771	9,627	83.8%
Private	43	87,861	41	23,944	59,219	28.8%
Rural / Regional	39	71,799	35	56,340	6,701	89.4%
Tertiary	47	296,630	46	221,305	73,768	75.0%
Total	156	527,253	145	351,360	149,315	70.2%

Data from 156 ICUs that reported both Unplanned and Planned Admissions.

Table 16 Total Bed Days in 2017/18, by Region

Region	Total Bed Days		Unplanned and Planned Bed Days			
	No. ICUs	Total Bed Days	No. ICUs	Unplanned Bed Days	Planned Bed Days	% Unplanned Bed Days
ACT	4	18,783	4	13,635	5,148	72.6%
NSW	47	184,108	41	118,573	50,026	70.3%
NT	2	6,468	2	5,879	589	90.9%
QLD	31	85,610	31	58,078	30,077	65.9%
SA	9	38,085	9	25,526	12,559	67.0%
TAS	3	5,300	3	4,544	756	85.7%
VIC	30	104,062	28	66,593	30,171	68.8%
WA	9	33,565	8	21,886	8,925	71.0%
NZ	21	51,272	19	36,647	11,063	76.8%
Total	156	527,253	145	351,360	149,315	70.2%
AUS Total	135	475,982	126	314,714	138,253	69.5%

Data from 156 ICUs that reported both Unplanned and Planned Admissions.

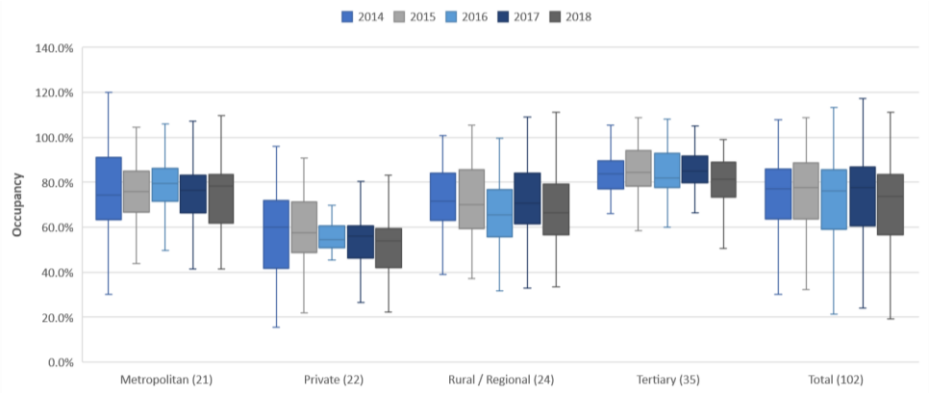
Appendix 5 - Occupancy

Table 17 Unit Occupancy in 2016/17 and 2017/18, by Classification

Hospital Classification	No. ICUs	% Occupancy	
		2017	2018
Metropolitan	24	76.7%	76.6%
Private	32	55.2%	48.1%
Rural / Regional	31	73.5%	73.2%
Tertiary	45	84.9%	82.3%
Total	132	76.1%	73.1%

Data from 132 consistently contributing ICUs.

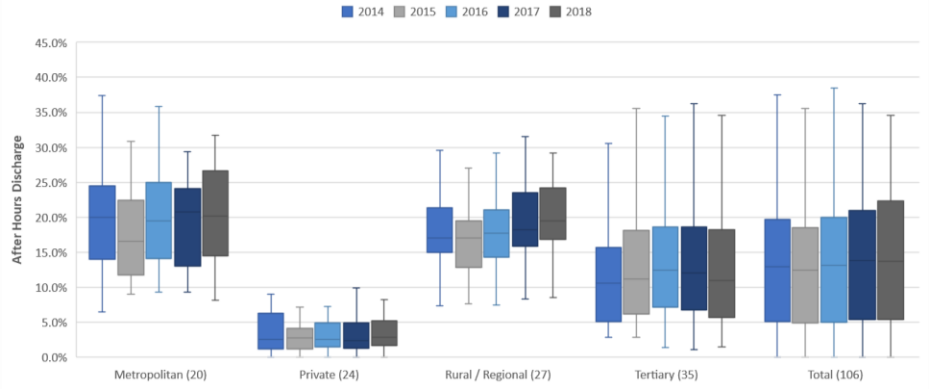
Figure 54 Median and IQR Unit Occupancy over 5 years, by Classification



Data from 102 consistently contributing ICUs.

After Hour Discharge

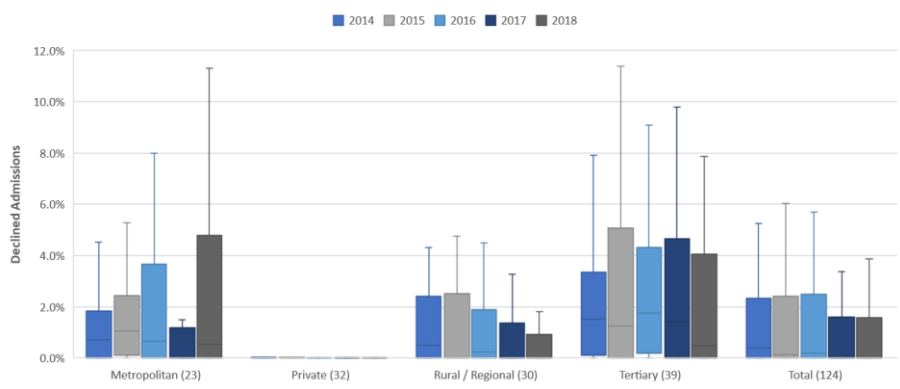
Figure 55 Median and IQR Unit After Hours Discharge Rate over 5 years, by Classification



Data from 106 consistently contributing ICUs.

Appendix 5 – Occupancy *continued*

Figure 56 Median and IQR Combined Declined Admission Rate over 5 years, by Classification

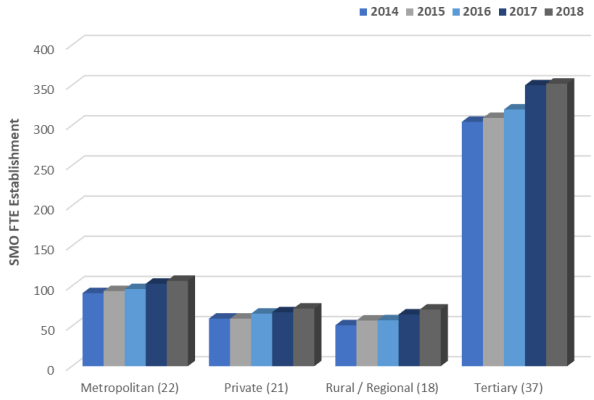


Data from 124 consistently contributing ICUs.

Appendix 6 - Workforce

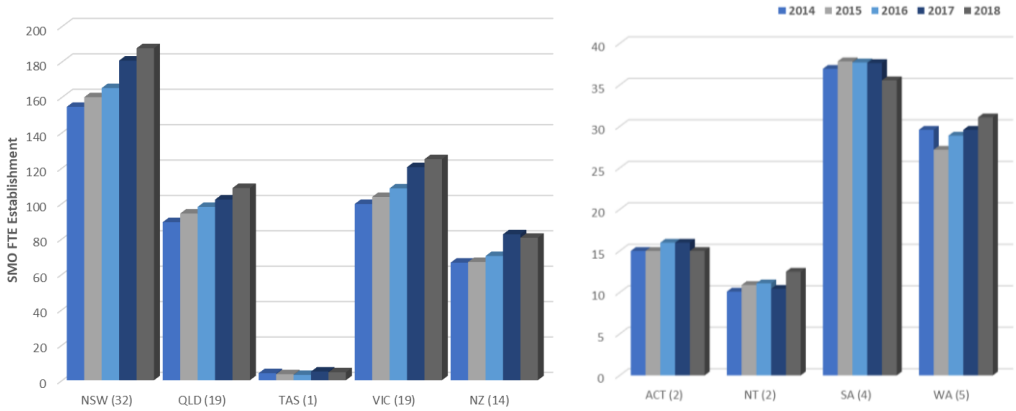
Senior Medical Officer

Figure 57 Total Established SMO FTE over 5 years, by Classification



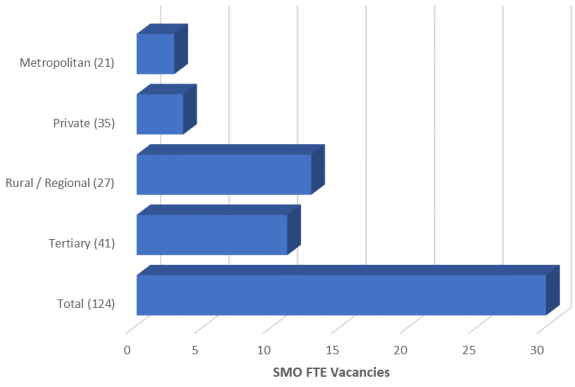
Data from 98 consistently contributing ICUs.

Figure 58 Total Established SMO FTE over 5 years, by Region



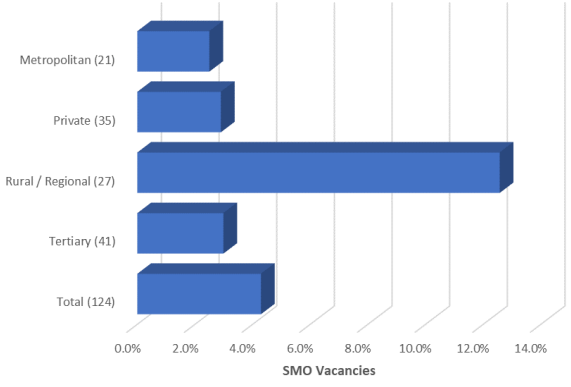
Data from 98 consistently contributing ICUs.

Figure 59 SMO Vacant Positions (FTE) in 2017/18, by Classification



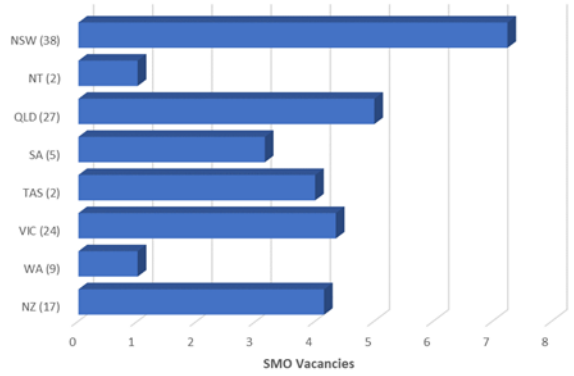
Data from 124 ICUs.

Figure 60 Proportion of SMO Vacancy in 2017/18, by Classification



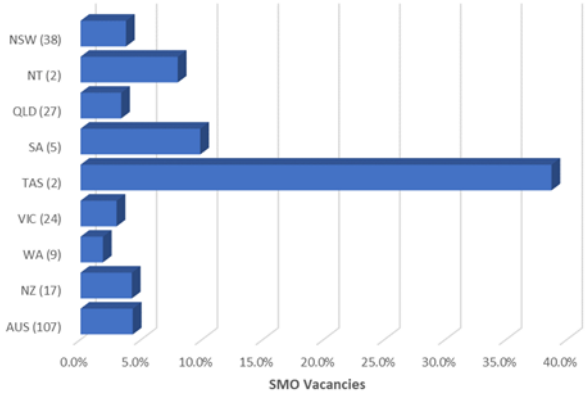
Data from 124 ICUs.

Figure 61 SMO Vacant Positions (FTE) in 2017/18, by Region



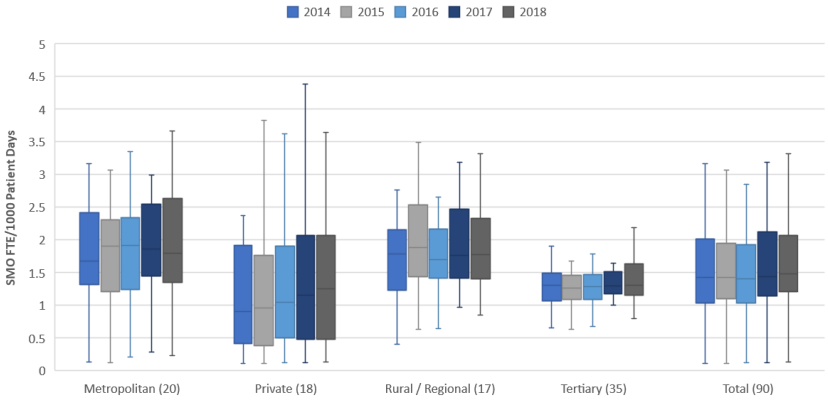
Data from 124 ICUs.

Figure 62 Proportion of SMO Vacancy in 2017/18, by Region



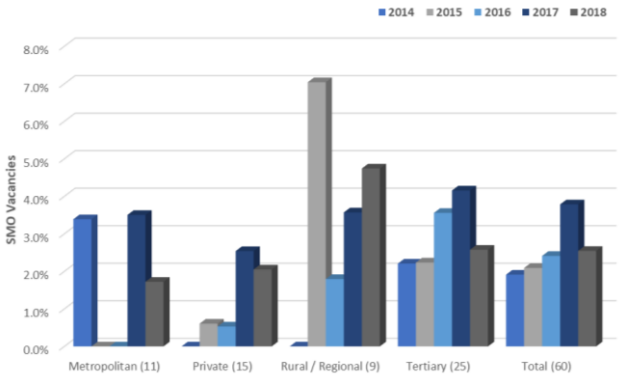
Data from 124 ICUs.

Figure 63 Median and IQR SMO FTE per 1000 Patient Days over 5 years, by Classification



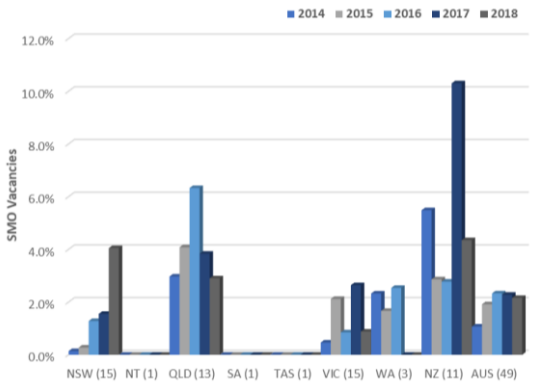
Data from 90 ICUs.

Figure 64 Proportion of SMO Vacancies over 5 years, by Classification



Data from 60 consistently contributing ICUs.

Figure 65 Proportion of SMO Vacancies over 5 years, by Region



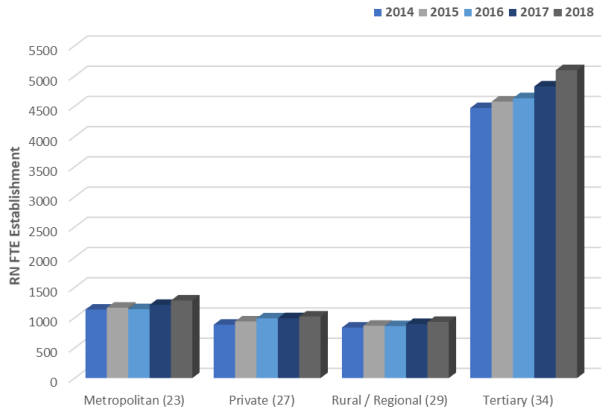
Data from 60 consistently contributing ICUs.

Table 18 Proportion of Junior Medical Staff in 2017/18, by Classification

Hospital Classification	Fellow		Senior Registrar		Registrar	
	CICM (n=134)	Non-CICM (n=130)	CICM (n=131)	Non-CICM (n=129)	CICM (n=137)	Non-CICM (n=146)
Metropolitan	16.7%	2.9%	2.1%	6.3%	13.5%	19.4%
Private	11.8%	22.9%	15.8%	12.7%	14.7%	11.0%
Rural / Regional	16.7%	37.1%	0.8%	3.2%	11.3%	11.9%
Tertiary	54.9%	37.1%	81.3%	77.8%	60.5%	57.7%

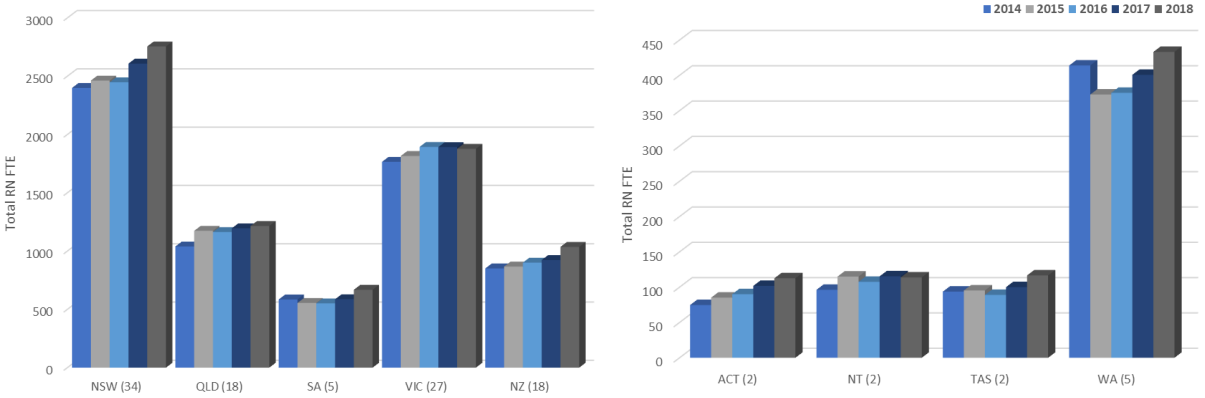
Registered Nurse

Figure 66 Total Established RN FTE over 5 years, by Classification



Data from 113 consistently contributing ICUs.

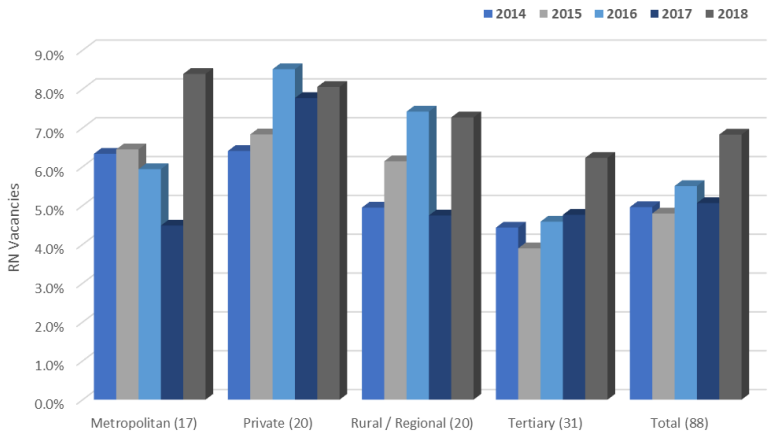
Figure 67 Total Established RN FTE over 5 years, by Region



Data from 113 consistently contributing ICUs.

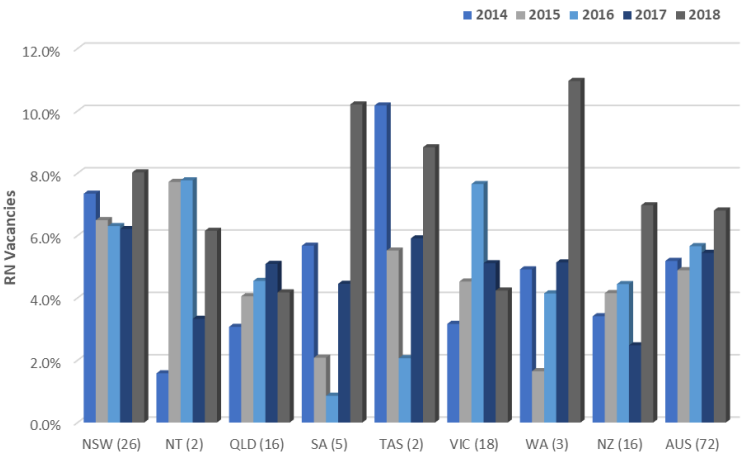
Appendix 6 – Workforce *continued*

Figure 68 Proportion of RN Vacancies over 5 years, by Classification



Data from 88 consistently contributing ICUs.

Figure 69 Proportion of RN Vacancies over 5 years, by Region



Data from 88 consistently contributing ICUs.

Appendix 7 – Contributing ICUs

Australian Capital Territory		
Metropolitan	Calvary Hospital (Canberra)	
Private	Calvary John James Hospital	National Capital Private Hospital
Tertiary	Canberra Hospital	
New South Wales		
Metropolitan	Bankstown-Lidcombe Hospital Calvary Mater Newcastle Campbelltown Hospital Canterbury Hospital Fairfield Hospital	Gosford Hospital Hornsby Ku-ring-gai Hospital Kempsey District Hospital Sutherland Hospital & Community Health Services
Private	Calvary Health Care Riverina (Wagga) Kareena Private Hospital Lake Macquarie Private Hospital Macquarie University Private Hospital Mater Private Hospital (Sydney) Newcastle Private Hospital North Shore Private Hospital Norwest Private Hospital	Prince of Wales Private Hospital (Sydney) St George Hospital Private (Sydney) St Vincent's Private Hospital (Sydney) Sydney Adventist Hospital Sydney Southwest Private Hospital The Chris O'Brien Lifehouse Westmead Private Hospital
Rural / Regional	Bathurst Base Hospital Bowral Hospital Coffs Harbour Health Campus Dubbo Base Hospital Goulburn Base Hospital Grafton Base Hospital Griffith Base Hospital Lismore Base Hospital	Manning Rural Referral Hospital Port Macquarie Base Hospital Shoalhaven Hospital Tamworth Base Hospital Tweed Heads District Hospital Wagga Wagga Base Hospital & District Health Wyong Hospital
Tertiary	Concord Hospital (Sydney) John Hunter Hospital Liverpool Hospital Nepean Hospital Prince of Wales Hospital (Sydney) Royal North Shore Hospital Royal Prince Alfred Hospital	St George Hospital (Sydney) St Vincent's Hospital (Sydney) Sydney Children's Hospital PICU The Children's Hospital at Westmead PICU Westmead Hospital Wollongong Hospital
Northern Territory		
Metropolitan	Royal Darwin Hospital	
Rural / Regional	Alice Springs Hospital	
Queensland		
Metropolitan	Caboolture Hospital Ipswich Hospital Logan Hospital	Queen Elizabeth II Jubilee Hospital Redcliffe Hospital Robina Hospital
Private	Brisbane Private Hospital Buderim Private Hospital Gold Coast Private Hospital Greenslopes Private Hospital Holy Spirit Northside Hospital John Flynn Private Hospital	Mater Private Hospital (Brisbane) Noosa Hospital St Andrew's Hospital (Toowoomba) Sunnybank Hospital The Wesley Hospital
Rural / Regional	Bundaberg Base Hospital Cairns Hospital Hervey Bay Hospital	Mackay Base Hospital Rockhampton Hospital Toowoomba Hospital
Tertiary	Gold Coast University Hospital Gold Coast University Hospital ICU-Paediatric Lady Cilento Children's Hospital PICU Mater Adults Hospital (Brisbane) Princess Alexandra Hospital	Royal Brisbane and Women's Hospital Sunshine Coast University Hospital The Prince Charles Hospital The Townsville Hospital The Townsville Hospital ICU-Paediatric
South Australia		
Metropolitan	Lyell McEwin Hospital	

South Australia *continued*		
Private	Calvary North Adelaide Hospital Calvary Wakefield Hospital (Adelaide) St Andrew's Hospital (Adelaide)	The Memorial Hospital (Adelaide) Western Hospital (SA)
Tertiary	Flinders Medical Centre ICU Royal Adelaide Hospital ICU	Women's & Children's PICU
Tasmania		
Metropolitan	Launceston General Hospital	
Rural / Regional	North West Regional Hospital (Burnie)	
Tertiary	Royal Hobart Hospital NICU/PICU	
Victoria		
Metropolitan	Box Hill Hospital Dandenong Hospital Frankston Hospital	Maroondah Hospital The Northern Hospital
Private	Cabrini Hospital Epworth Eastern Private Hospital Epworth Geelong Epworth Hospital (Richmond) Holmesglen Private Hospital John Fawkner Hospital	Melbourne Private Hospital Peninsula Private Hospital St John of God (Bendigo) St John of God (Geelong) St Vincent's Private Hospital Fitzroy Warringal Private Hospital
Rural / Regional	Albury Base Hospital Ballarat Health Services Bendigo Health Care Group Central Gippsland Health Service Goulburn Valley Health Latrobe Regional Hospital	Mildura Base Hospital Northeast Health Wangaratta South West Healthcare (Warrnambool) Western District Health Service (Hamilton) Wimmera Health Care Group (Horsham)
Tertiary	Monash Medical Children's Hospital Alfred Hospital Austin Hospital Monash Medical Centre-Clayton Campus	Royal Children's Hospital (Melbourne) PICU Royal Melbourne Hospital St Vincent's Hospital (Melbourne) University Hospital Geelong
Western Australia		
Metropolitan	Armadale Health Service Joondalup Health Campus	Rockingham General Hospital
Private	Mount Hospital	
Rural / Regional	Bunbury Regional Hospital	
Tertiary	Fiona Stanley Hospital Perth Children's Hospital	Royal Perth Hospital Sir Charles Gairdner Hospital
New Zealand		
Metropolitan	North Shore Hospital Tauranga Hospital	Timaru Hospital ICU Whangarei Area Hospital, Northland Health Ltd
Private	Southern Cross Hospital (Hamilton) Southern Cross Hospital (Wellington)	Wakefield Hospital (NZ)
Rural / Regional	Hawkes Bay Hospital Hutt Hospital Nelson Hospital Palmerston North Hospital	Rotorua Hospital Southland Hospital Taranaki Health Wairau Hospital
Tertiary	Auckland City Hospital CV Auckland City Hospital DCCM Christchurch Hospital Dunedin Hospital	Middlemore Hospital Starship Children's Hospital PICU Wellington Hospital

Appendix 8 – Abbreviations

ACHS	Australian Council on Healthcare Standards
ACT	Australian Capital Territory
ANZICS	Australian and New Zealand Intensive Care Society
ANZPIC	Australian and New Zealand Paediatric Intensive Care Registry
APD	Adult Patient Database
AUS	Australia
CCR	Critical Care Resources
CCU	Coronary Care Unit
CICM	College of Intensive Care Medicine
CLABSI	Central Line Associated Blood Stream Infection
CORE	Centre for Outcome and Resource Evaluation
ED	Emergency Department
FTE	Full Time Equivalent
HDU	High Dependency Unit
ICU	Intensive Care Unit
MET	Medical Emergency Team
NICU	Neonatal Intensive Care Unit
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
OT	Operating Theatre
PICU	Paediatric Intensive Care Unit
QLD	Queensland
RN	Registered Nurse
SA	South Australia
SMO	Senior Medical Officer
SQL	Structured Query Language
TAS	Tasmania
VIC	Victoria
WA	Western Australia

Appendix 9 – Glossary

Available Bed	A bed with advanced life support capability that is fully staffed and funded.
Bed Days	A bed-day is a day during which a person occupies a bed in which the patient stays overnight in an ICU.
Declined Admissions	The CCR Survey collects two variables on declined admissions; declined elective surgery admissions due to inadequate ICU resources and declined unplanned admissions due to inadequate resources. Declined elective surgery admissions due to inadequate resources are calculated as a proportion of planned admissions to ICU and declined unplanned admissions due to inadequate resources as a proportion of unplanned admissions to ICU. The two data point are combined to calculate an overall declined admission rate as a proportion of total ICU admissions.
Exit Block	Delay in the discharge of a patient of 6 hours or more.
Full Time Equivalent	A unit that indicates the workload of an employed person (or student) in a way that makes workloads comparable across various contexts.
Intensivist	A medical practitioner who has been specifically trained in intensive care medicine. Intensive care specialists are formally certified in intensive care by completing the training requirements of the CICM.
Interquartile Range	The range between the first and third quartile (25%-75%) when values are listed in ascending order.
Invasive Ventilation	Mechanical ventilator support via oral/nasal intubation of tracheostomy tube.
Percentage Occupancy	Patient Bed Days divided by the total number of Available Beds multiplied by the number of days for the given period.
Median	The middle value when values are listed in ascending order.
Medical Emergency Team/Rapid response Team	Medical and nursing with advanced clinical and resuscitation skills who respond to at-risk patients in settings outside the ICU. Such patients present with specific criteria
Non-Invasive Ventilation	Ventilatory support such as CPAP/BiPAP, administered via facial or nasal mask or nasal cannulae.
Occupancy Rate	Calculated by the number of bed days divided by the number of available bed multiplied by 365 days
Planned Admission	A planned admission to ICU/HDU. Post-surgical/procedure admissions are considered planned admissions when the need for admission was anticipated pre-operatively or prior to induction of anaesthesia. For non-surgical admissions, a planned admission should be considered as one that could be postponed for 24 hours with no adverse effect.
Physical Bed	A single patient care location fully configured to ICU standards. It is an actual bed, not a bed space.
Undivided Admission	Admissions that have not been classed as unplanned (emergency) or planned, or ICU or HDU, but have been reported to CCR.
Unplanned Admission	An emergency admission to ICU/HDU for urgent care or treatment that could not be postponed without adverse effect. A postponed planned admission can subsequently become an unplanned or urgent admission.
Ventilator Bed	A physical ICU bed plus ventilator.